

THE IRON AGE

Contents for September 4, 1930



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239 West 39th Street,
New York, N. Y.

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UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

District Offices:

CHICAGO, Otis Building
PITTSBURGH, 1319 Park Building
CLEVELAND, 1362 Hanna Building
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BOSTON, Room 230, 80 Federal St.
SAN FRANCISCO, 703 Market Street

Copyright, 1930, by

IRON AGE PUBLISHING CO.

Member, Audit Bureau of Circulations

Member, Associated Business Papers

Published every Thursday. Sub-

scription Price: United States and

Possessions, Mexico, Cuba, \$6.00;

Canada, \$8.50; foreign, \$12.00 a

year. Single Copy 25 cents.

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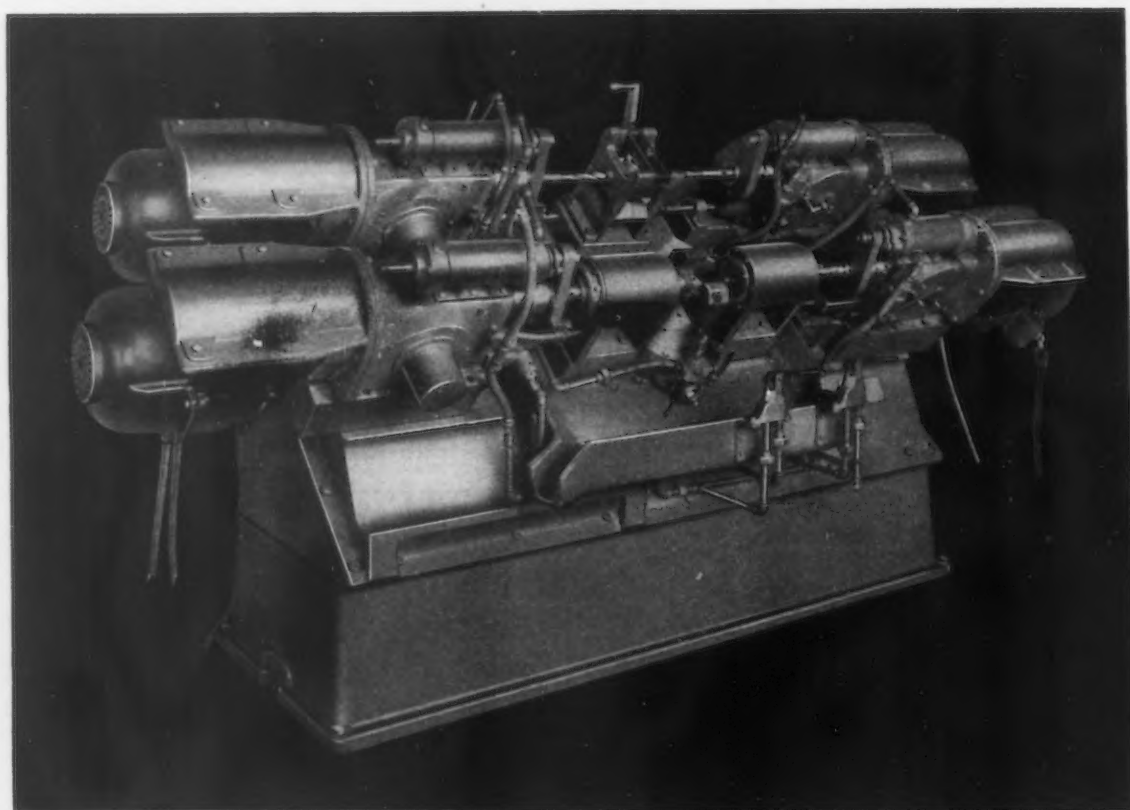
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Reader Service Man Investigates

JUST dropped into the sanctorum of E. F. Cone, our metallurgical editor, to find what he has on the fire for next week's issue, the A. S. S. T. convention number. He recited a list of high spots a yard long; R. Sergeson on nitriding, Dr. R. J. Anderson on heat treating aluminum alloys, H. Bornstein on heat-treating gray iron castings, A. W. Lorenz on heat-treating steel castings, Herbert M. Boylston on recent progress in heat-treating, Robert M. Keeney on heat-treating furnaces, R. R. Moore on heat-treating airplane engine parts. And that isn't all. An all-star cast. If there is any important development in the heat-treating field that isn't discussed in next week's issue, it will have to develop between now and next Wednesday.—A. H. D.



Millholland devises this novel use for New Departure Ball Bearings



In connection with the combination tool spindles of this new Millholland machine, New Departure Ball Bearings support sleeves which in turn give rigid and accurate support to the spindles which reciprocate through them. These sleeves are located as closely as possible to the tools so that all tendency to deflection from side thrust is overcome. Rotary motion is communicated to the sleeves by key and keyway connections with the spindles. Twenty-four New Departure Ball Bearings support these and all other vital shafts in this machine in which 300 pistons per hour are bored, faced on the open end, centered on the closed end, and their wrist pin holes drilled. New Departures simplify the lubrication problem, prevent vibration and chatter at the high speeds necessary, carry thrust and all other loads with the least possible loss of power. New Departure-equipped machines are better from the start . . . and cheaper in the end. The New Departure Manufacturing Co., Bristol, Connecticut.



1609

NEW DEPARTURE BALL BEARINGS

This Issue in Brief

Is your budget in keeping with present reduced production volume and narrower profit margins? At Saturday afternoon meetings of department heads economies are decided upon. Pay-roll deadwood eliminated; factory expense budget cut; general labor for each department budgeted on basis of direct labor.—Page 606.

* * *

Factory expense cut sharply by waste elimination campaign. Each department is kept informed of its standing. To display boards in each department are fastened broken tools, parts and supplies. President's cup is awarded for best record.—Page 614.

* * *

Warping in heat-treated parts allowed for in machining. Milling wearing surfaces of locomotive cross heads with a slight concavity results in such a straight surface after quenching that less than 1/64 in. of metal needs be ground off.—Page 626.

* * *

Electroplates rubber on metal racks to provide acid-resisting surface. Excellent for plating use, as the rubber is an insulator and prevents current losses.—Page 618.

* * *

Steel is seldom injured in the finish rolling, steel maker finds. Practice has to be abnormal to harm the quality of the steel. Open-hearth and blooming departments are where physical properties are made.—Page 623.

* * *

Why will two grinding wheels of the same specifications give different results? Cause: Variation in the amount of abrasive in the wheel in relation to other factors, abrasive manufacturer finds. This factor can now be controlled within one per cent.—Page 630.

Saves space in heat-treating department by mounting switch-board transformer and control equipment on top of furnace.—Page 616.

* * *

Carburizing pots made of cast iron water pipe. Long pieces are carburized in home-made pots made from 16-in. pipe, 10 ft. long. A steel plate forms bottom.—Page 627.

* * *

Heat loss in charging carburizing furnace is markedly reduced by using electric truck. Work that formerly took nearly 3 hr. is done in 2 min. In addition the time of six men is saved per shift. Direct labor saving alone is \$13,000.—Page 624.

* * *

Export market can absorb huge volume of metal-working equipment, says Department of Commerce executive. Proper cultivation should result in continued heavy exports.—Page 628.

* * *

Cuts accidents 97 per cent by safety campaign. Every department inspected each month by chief safety committee, composed of three general foremen and personnel executive. At weekly meetings recent accidents are discussed.—Page 611.

* * *

Heat loss in heat treating tractor parts is reduced to a minimum by use of a conveyor which operates entirely within the furnace. Chain belt acts as the hearth.—Page 615.

* * *

Foremen submit service card record every six months on every employee. Employees are rated on various qualifications, one of which is "Co-operation in Waste Elimination." Employee is given a copy. A poor record, if continued, is reason for dismissal.—Page 614.

Tensile strength of drive shaft raised more than 12 per cent by using chrome-nickel-molybdenum steel instead of chrome-nickel. The addition of molybdenum makes an appreciable improvement in the physical properties of the steel.—Page 615.

* * *

Rubber-coated plating tanks have long life. Rubber in sheets is cemented to metal surface and is hand-rolled to exclude air, so that perfect adhesion will be obtained.—Page 618.

* * *

Casting rejects reduced from 4.07 per cent to 2.3 per cent. Waste campaign shows marked results in brass foundry operation.—Page 614.

* * *

Double hardening of gears, with first heating to 1500 deg., and second to 1375-1425 deg., gives best results in treating tractor gears.—Page 616.

* * *

Free use of optical pyrometers educates eyes of steel melters in judging steel and furnace temperatures.—Page 622.

* * *

Old foundry flasks serve as furnace structure for carburizing 6 ft. cross heads.—Page 627.

* * *

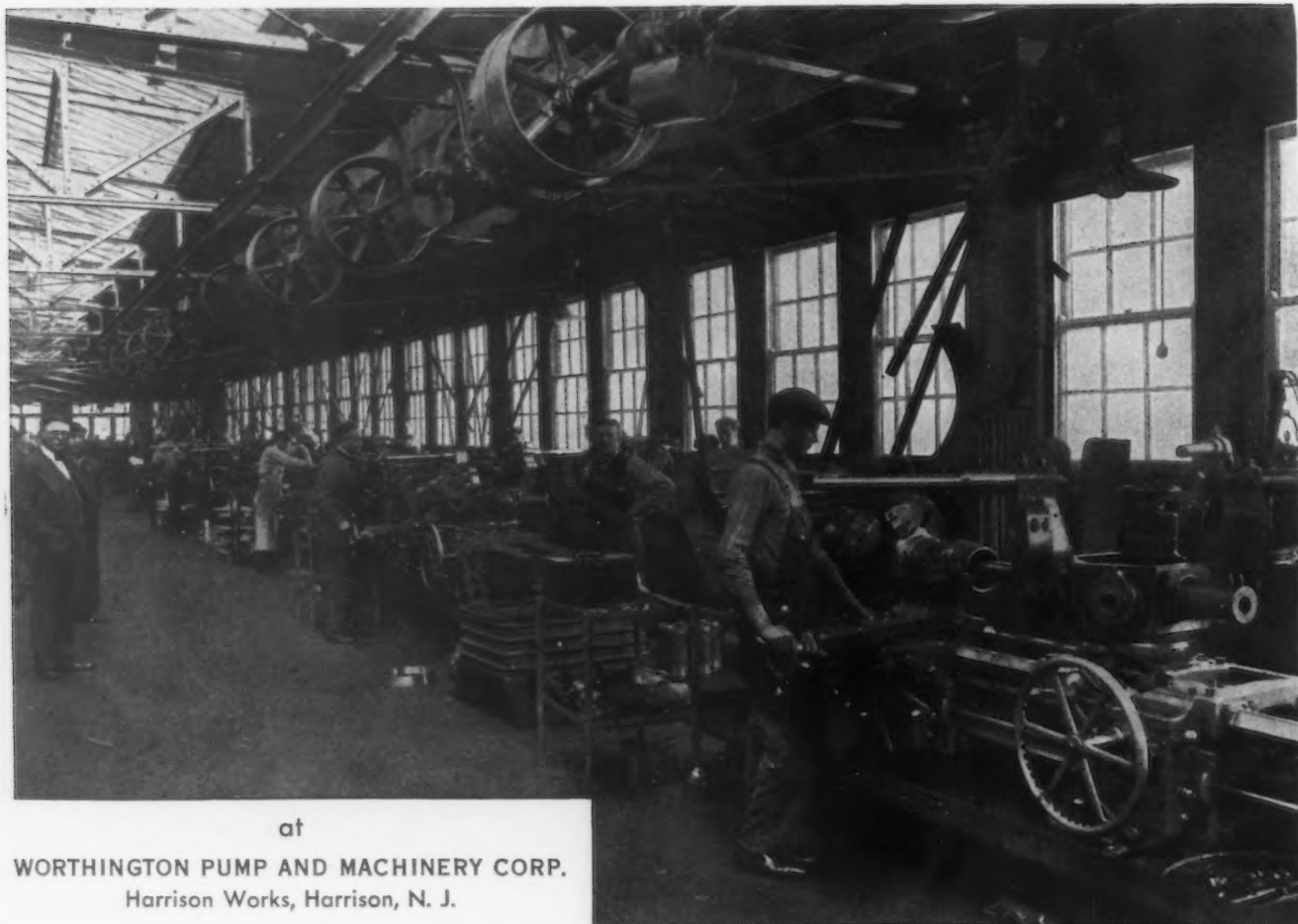
Unintentional variations from recommended procedure sometimes lead the way to improvement in standard practice, steel maker finds.—Page 622.

* * *

For the success of an economy campaign, necessary in almost every company these days, try to get everyone in your organization to act as an intreprenuer, rather than as a routine employee. If you can do this, you will get outstanding results.—Page 606.

14

Warner & Swasey Turret Lathes
are in use in one department alone
having replaced lathes, special machines and other turret lathes



at

WORTHINGTON PUMP AND MACHINERY CORP.
Harrison Works, Harrison, N. J.

Their work would ordinarily require constant tool changes, but they eliminate this with WARNER & SWASEY Turret Lathes and standard tool set-ups.

The Warner & Swasey Company

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Milwaukee:
1143 Wells Bldg.

Syracuse:
108 Grant Ave.

THE IRON AGE

New York, September 4, 1930

ESTABLISHED 1855

VOL. 126, No. 10

BROADENED SERVICE

For a New Industrial Epoch

A BROADENED editorial service begins with this number of The Iron Age. Changes introduced both in program and in methods of presentation are in tune with the increasing intensity of industrial effort.

■ ■ ■

Some four hundred additional pages a year have been allotted to the discussion of production methods and practices. A fully rounded schedule of publication has been laid out as the result of extensive field studies. The plan covers revised balance and periodicity in dealing with the various phases of reader interest, while timeliness will remain a cardinal principle of our policy.

■ ■ ■

Our editorial staff has been enlarged and strengthened and contacts in metal-working plants have been broadened.

■ ■ ■

Henceforth, the business news of the metal-working industry, the market reports, price quotations and other commercial information will appear in a special section, printed on tinted pages for ready reference.

■ ■ ■

A new feature of this section will be a weekly survey of industrial construction. This will supplement the weekly summaries that have long been a dependence in shaping the plans of industry. Three barometers of trade will now

be available: one based on raw materials, one on machine tools and a third on expansion of industrial plant and equipment.

■ ■ ■

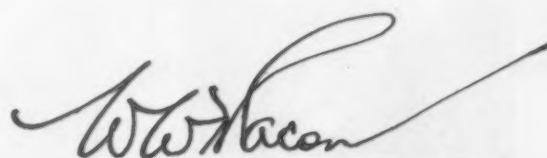
For the busy general executive, who must keep in touch with developments in all branches of the industry, we have devised a system of "half-minute summaries" to present the salient points of leading articles at a glance. These, and the summaries in the tinted news section, will keep this type of reader posted with a minimum expenditure of time.

■ ■ ■

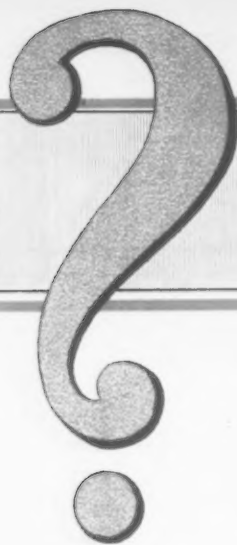
The "suggestive executive questionnaire" is another new and thought-stimulating feature calculated to enhance the value of The Iron Age. Questions which an executive might profitably ask respecting his own methods and practice are presented with the articles that suggest them.

■ ■ ■

All of these forward steps aim to serve the reader with a maximum of timely aids and thus to promote commercial and technical progress in the truly majestic industry dedicated to the making of metal products and machinery.



Editor.



PUTTING the QUESTION

An Executive Round Table—Conducted by John

WE have with us today, at this IRON AGE Executive Round Table, a number of gentlemen who are the heads of important industrial organizations. Each of them has faced, during the past months, the necessity of making adjustments in methods and policies to meet new conditions, and of placing added emphasis on the subject of cost and expense reduction. All of us, with few exceptions, are confronted by the same problem of earning a profit through economies instead of through increased volumes and turnover. Regardless of an upturn in business conditions, all of us will face this condition for months to come, during the readjustment period.

The methods that these gentlemen have found effective in the solution of this problem in their own organizations are applicable to other organizations in all branches of the metal-working industry. Briefly put, these methods resolve themselves into an intensive application of the question mark.

In this informal discussion of a very timely subject, we shall hear from five chief executives in diversified branches of the industry, who have consented to tell us something about the ways in which they have

put the question mark to work to meet present day conditions. We hope that the readers of THE IRON AGE who are sitting in with us at this round table will join in the general discussion of the subject, which will be presented in a later issue, by submitting constructive suggestions drawn from their own experience.

The first gentleman that we shall hear from today is the chief executive of a large and well known concern which manufactures agricultural implements, presses and wood-working machinery, Mr. Francis Farquhar, president, A. B. Farquhar Co., Ltd., York, Pa.

Mr. Farquhar: "As soon as we realized the seriousness of the situation, I arranged for meetings on Saturday afternoons with our various heads of departments. The first object was to go over the payroll, and eliminate such deadwood as might be found. But this object soon broadened out considerably.

"Previous to our intensive use of the question mark, I had thought that we had a very good budget system. Evidently, however, I thought I knew more about this than I actually did, for when we got to going into the matter and actually began budgeting the various



FRANCIS FARQUHAR



E. R. CRAWFORD



A. A. KRAMER

MARK TO WORK...



H. Van Deventer, Industrial Consultant, THE IRON AGE



Half-Minute Summary

EARNING a profit on reduced production volumes is the problem good management is now solving. It is being done through the intelligent and systematic questioning of operating costs and expenses.

In this Iron Age Executive Round Table, a number of heads of important companies tell us how they are applying the question mark in their work, and with what results.



departments, the situation became quite illuminating.

"First, we took the features common to all departments, such as repairs to equipment, repairs to machinery, small tools and buildings. We found that we were spending entirely too much on these items in comparison with the business being done, and that during 1928 and 1929 the figures covering them had been literally running away. In planning our new budget, however, we did not forget that it is decidedly unwise to allow machinery or equipment to deteriorate. But we could and did arrive at budgets for the various repair items in each department.

"Next, we took up the subject of general labor in

each department, and tried to arrive at a ratio of one general laborer for so many mechanics. Of course this figure varied among departments because of the nature of the work, but we finally were able to fix upon ratios. Following this step, we took up the matter of determining budgets for such items as crane operation, minor supervision, trucking and handling,

oiling, lumber inspection, stock-keepers, yard men, etc. We were not always in accord as to these budgets at the outset, but finally determined upon them. This resulted in our having a rather complete set of subdivisions in each department, in fact we have covered some one hundred and fifty separate divisions. Some of these have been and are being revised from time to time. All of these budgets, by the way, were finally



F. J. RYAN



D. S. DIAMOND

Participating in this Iron Age Conference:

FRANCIS FARQUHAR
President,
A. B. Farquhar Co., Ltd.

E. R. CRAWFORD
President,
McKeesport Tin Plate Co.

A. A. KRAMER
President,
Columbian Steel Tank Co.

F. J. RYAN
President,
Ryan, Scully & Co.

D. S. DIAMOND
President,
Federal Screw Works

based on the productive labor in each department, which brings them in line with production volumes. In the non-productive departments such as the pattern making department, the labor on new patterns was classified as productive.

"It is very instructive to go over the budget results each month. By having a number of our leading men do this we not only know where our expenditures have been excessive, but often see where we can make further substantial savings.

"While we were about it, we went ahead with the budget matter and extended it to our sales department. This process is still going on with us as conditions and the character of our output change.

"We have not reduced wages, nor, so far as we know, has anyone in this city.

"While this budgeting work has proved extremely interesting to us, even more interesting has been the revision of our productive work methods. This has been going on with us more extensively than before and we have succeeded in making some striking improvements. Since this also is probably going on quite universally in industry as a whole, the depression will probably not be without some wholesome effects. Of course inefficient production methods should not be tolerated at any time, but when conditions make it necessary to question work-methods from the ground up, it seems easier to detect inefficiencies and to make changes.

"Finally, we are endeavoring, through changes in our output and budgeting methods in our sales department, to overcome seasonal unemployment and seasonal rushes of work. While this is really the hardest task of all, we believe that we are making progress; and, indeed, know that it has been very substantial progress if we compare results with those of eight or ten years ago."



▲ ▲ ▲

Thank you, Mr. Farquhar, for the very helpful comments that you have made, upon the basis of your own experience. We believe that the depression has thoroughly "sold" industry on the usefulness of budgets, and that many concerns that have not used them heretofore will soon be doing so. We also believe that many executives have found it as necessary to question their budgets as to question operating practice, for fixed ideas of any kind, even in budgeting, are harmful.

It is to be expected that there will be more opportunity for "taking up the slack" in plants having a wide variety of more or less complicated products than in plants making simpler products which are highly standardized, assuming an equal grade of management ability to be present in both. Can the executive question mark do much for the plant with highly

standardized product and highly specialized operations?

The manufacture of screw products represents an extreme case of specialization. If the question mark can make real progress in economies in such a plant, it should be able to do business anywhere. We have asked the president of the Federal Screw Works, of Detroit, Mr. D. S. Diamond, to tell us something about his recent experiences in this connection.

Mr. Diamond: "Like a good many other concerns, we prided ourselves in the past on the fact that we were constantly striving to keep overhead expenses in line, to reduce manufacturing costs and to stimulate sales. That was before the industrial depression. Now, in the light of our experience since that time, we must admit that there was still considerable room for improvement. The depression has forced not only

our executive staff but our whole personnel to put forth much greater effort. We have been really surprised at the results obtained when a concerted effort of this sort is made for the purpose of effecting savings.

"We, too, have found that the most important step toward economies is the closer scrutiny of expenses that is obtained through budgetary control. In our case, an important part of this is the close executive scrutiny which is given to purchase requisitions covering raw materials, tools, supplies, etc. We have found that in many cases requisitions are made out for purchases that are not absolutely necessary. In other cases, we have found that they raise the question as to whether a change in our methods might eliminate or reduce the expenditure. We use such things as the means of starting every one interested in the matter to thinking constructively for the interest of the organization.

"We have found it particularly helpful to encourage the constructive use of the question mark throughout the entire organization. This results in increased efficiency in manufacture for the reason that everyone, from the superintendent down to the humblest worker, is continually striving to eliminate waste by helping the other employees to do their work more efficiently. During an economy campaign of this sort, it is my belief that the shop foremen, in particular, are made to do some real constructive thinking along the lines of efficient manufacturing.

"In conclusion, I should like to leave this thought with you, which summarizes our experience in a few words. During a time like the present, try to get everyone in the organization to act in the capacity of an entrepreneur, rather than a routine employee. If this spirit can be instilled throughout an organization, the results will stand out as representing real progress."

Mr. Diamond has given us an idea that should be of great value to every concern that is faced with the problem of effecting economies. An economy program which exists in the minds of a few executives is not likely to be of maximum effectiveness. An economy program, however, that is thoroughly favored or approved by all of the members of the organization, will produce the required results through concerted action.

Whenever there is a major change in the tide of business, industry and its management are faced with a new set of problems. During the past few years the problem of increasing sales and production volumes and of quickening turnover occupied the chief part of managerial attention. Now, the emphasis is laid upon cost and expense reduction. What will be the effect of this on future industrial activities? Having found the new effectiveness of the question mark, will management be content to lay it aside when the tide turns again, or are we entering upon an era which will be representative of a higher degree of industrial efficiency?

We have asked Mr. E. R. Crawford, president, McKeesport Tin Plate Co., to express his views on this phase of the subject.

Mr. Crawford: "It is my belief that depressions in trade, such as we have had since last September or October, always result in good for the future. We have found, in going over our plant from beginning to end, as well as having combed with a fine tooth comb every item of expenditure, that we have been able to effect some considerable economies. In fact I believe that during the past two or three years, we have been able to effect economies which more than represent the actual net profit we are making on all the tin plate we sell today. It is my opinion also that profits in the larger lines of manufacture must be made by

economies in every direction, such as in purchasing, manufacturing, marketing, etc.

"It is also my candid opinion that if more attention were given to things of this kind instead of laying so much stress on the matter of depression, which in many cases is psychological rather than real, we would have a generally better feeling, which would result in a generally better business."



We believe that Mr. Crawford is right in his opinion that tomorrow's profits must be built out of today's economies. And if this is true, the lessons that industry is now learning in the more effective use of the question mark, should be of considerable value as a future prosperity factor.

One attractive and valuable feature of the executive question mark is its universality. No matter where it is applied, in large or small organizations; no matter what the product or services offered may be, if applied intelligently and persistently it produces results. In some cases it leads to a refinement in methods or a reduction in costs and expense items. In other cases the results may be as far reaching as to include a complete reorganization.

We have in mind one case in which the intelligent use of the question mark in the light of existing business conditions led an engineering and sales organization in the industrial heating field to expand to include manufacturing as well. The president of that organization, Mr. F. J. Ryan, of Ryan, Scully & Co., Philadelphia, will now tell us how the use of the question mark brought this about.

Mr. Ryan: "Although our volume of business booked at the first of this year was large, and there

Suggestive Executive Questionnaire

- 1—Have we set up a proper organization for the purpose of applying the question mark?
 - 2—Have we instilled the spirit of constructive questioning throughout our organization, so that its members take nothing for granted?
 - 3—Are we utilizing the competitive principle between departments and individuals in our search for cost reducing possibilities?
 - 4—Are we budgeting indirect labor on the basis of direct labor hours, so as to make its ratio proportionate to production volume?
 - 5—Are we allowing a fixed budget to handicap the search for progressive cost and expense reductions? In other words, have we sufficiently questioned the budget?
 - 6—Have we instituted a thorough study of the possibilities of a revision of productive work methods?
 - 7—Do we maintain a list of the economies that have been made since the change in business conditions, and who have suggested and effected them?
 - 8—Have our inventories been reduced in proportion to decreased production volumes? Are we applying pressure to make them still lower?
 - 9—Have we effected a system of thorough executive criticism of purchase orders?
 - 10—Are we avoiding possible cancellations through the making of quick deliveries?
 - 11—Are we paying enough attention to getting the small orders that our salesmen might ordinarily overlook?
-

was no distinct evidence of depression, I noticed in my contact with our sales work that more men were being brought into our prospective customers' sales discussions. I also noticed that the purchasing agent seemed to have more power than at any time during the past eight years.

"This indicated to me that while there was going to be business, the buying was going to be close and the competition keen. That opinion has been definitely borne out, for while we have been able to keep going on a 100 per cent basis and have kept incompleting business volume at a safe margin, we have been compelled to take business at a lower figure than ever before. I believe that this condition is not going to improve, but in fact, will become intensified.

"Unless your profits have been exorbitant, when you must take business at a lower figure, there are but two ways out for you; one is to increase your volume, the other to reduce your cost of operation.

"It is a difficult thing to increase the volume of business in a poor market, so the alternative lies in reducing the cost of doing business. Possibly you will be interested in finding out how we have solved that particular problem.

"Originally we functioned as an engineering organization. Some four and a half years ago, however, we established a small research shop, and as a by-product, did some of our own switchboard and control valve work. Profits seemed to accumulate, so we moved to a larger location and finally built our present headquarters some three years ago. At that time we felt that it was good for ten years. But when the change in business conditions occurred and we put the question mark to work, we decided that in the control of production of many of our products, we could find the additional profits necessary to solve our problem. So we immediately arranged for the erection of a new plant.

"Among the advantages secured in this way are quicker deliveries which will eliminate lost orders, the doing away with trucking charges of considerable amount, savings on volume purchases and an approximate reduction of 40 per cent in production costs. In addition we shall make substantial savings by increasing by 100 per cent the volume of products which can be shipped complete, thus saving erection expense. The establishment of a research laboratory containing all types of apparatus makes it possible to demonstrate and close sales at our own headquarters, rather than to make costly trips to isolated locations.

"The next question was where could we increase our output of normal products already established as standard? To determine this, we made a study of every article that we were producing. The result is that many of them are now being pushed in new and diversified fields.

"Putting the question mark to our sales division, we found there the quite natural desire to go after the big orders. There is a great thrill in obtaining a large order. But a large order usually involves a cut in

price, takes a long time to sell, and is not so attractive from a profit standpoint as a group of small orders reaching the same volume. By patiently showing our salesmen how this attitude affected them adversely as well as the company, we have been able to increase materially our volumes of small sales in nearly every district. This has carried us through a period that might have looked bad otherwise.

"Finally, we applied the question mark to our accounting and cost divisions. Strange as it may seem, we found many items that were being sold at a loss. We found that our buying was bad in spots and that we had many unbalanced items in our inventory, i.e., items in which we were carrying large quantities over long periods and others in which quick sales made the inventory of other items inadequate.

"In connection with inventory savings, you may be interested in how these are affected by the addition of plant facilities. Because of our previously manufacturing only approximately 15 per cent of our own products, practically our entire inventory represented finished items, such as burners, control valves, blast gates, switchboards, etc. Of the total value of these about 80 per cent is productive labor. Our new facilities will enable us to carry double the inventory of products that can be finished almost immediately, and yet this will involve a total inventory reduction of over 50 per cent.

"The foregoing represents the high points of what we have learned through putting the question mark to work. I would not say that all of the deficiencies have been corrected, but at least we know where they are, and are after them aggressively."

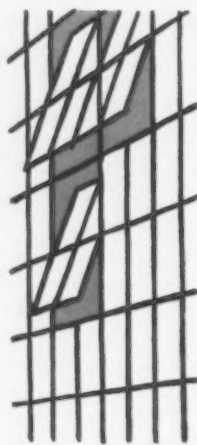


The interesting experiences that Mr. Ryan has just related bring out a point that it is well for all of us to keep in mind. It is not a difficult thing to correct deficiencies or eliminate inefficiencies once we know where and what they are. The hard thing is to find them. That is where the use of the question mark comes in. In good times we are so busy with other things that we do not find time to use it properly and as a result, inefficiencies are bound to creep into our plants and hide away.

There is little doubt that a continued period of prosperity tends to decrease industrial efficiency. From the long term view, a "technical correction" as they say of the stock market, is a good thing for us. Business depressions are bitter pills to take, but they produce a tonic effect upon the industrial system.

If we would keep the question mark at work intensively when business is good, perhaps it would never become bad. Some concerns have found this statement to be true and have made greater profits during the past year than ever before. One of these is the Columbian Steel Tank Co. of Kansas City, Mo. It is said that Missouri is the original home of the question mark, in the form of the well known expres-

(Continued on page 676)





Accidents and Waste Greatly Reduced by Ohio Brass Co. Campaign

A REMARKABLE record in reducing industrial accidents almost to the point of elimination has been attained by the Ohio Brass Co., Mansfield, Ohio. This has been accomplished by arousing the interest of the rank and file of workers in accident prevention. Results indicate that the desired goal in accident prevention cannot be reached without the hearty cooperation of employees. Another outstanding feature of the management of this plant is the organized efforts that are being conducted to eliminate waste, which also are bringing good results.

Previous to 1927, the company limited its safety work to mechanical requirements, giving no attention to educational work along safety lines. It safeguarded its machinery in conformity with the State law, and in some cases protected workers to a greater extent than the law required. In 1926 the company had 279 lost-time accidents, of which 79 resulted in a loss of more than one week to the injured employees. During 1927 the safety problem was put up to the foremen. While responsibility for preventing accidents was placed on the foremen's shoulders, they were not given any direct help in this direction by the management. However, with a certain amount of interest aroused among the foremen, lost-time accidents were reduced in 1927 to 156, of which 45 resulted in more than one week of lay-off.

Educational Work Among Employees

In 1928 the management extended its accident prevention activities to educational

work among its men and reduced its lost-time accidents to 20, of which 11 of the injured employees were incapacitated for more than one week. Going a few steps further in 1929, the company effected a safety work organization covering the entire plant and succeeded in reducing its accidents 50 per cent from the year before. During 1929 it had 10 lost-time accidents, six of which kept employees away from work for more than one week. Under the operation of this plan, the record for the first six months of this year indicates that there will be a further reduction of accidents this year. During the six months' period of 1930 there were three lost-time accidents, all for more than one week. Two of the injured had previous accidents and were guilty of contributory negligence.

The plant employees in the conduct of the safety work are divided into three groups and the activities are conducted largely through these group organizations. The plant has 31 departments and these are so grouped that the three groups are of nearly equal size numerically.

The guiding body in the safety organization is a general safety committee of four, of which a member of the staff of the director of personnel is chairman, the other three being general foremen, one of whom serves as supervisor for each group, or as team chairman. The group chairman is appointed by the director of personnel. Each group chairman has a safety committee in each department in his group that works with the depart-

What the Ohio Brass Co. Expects of Its Men

Do good work.

♦ ♦ ♦

Be dependable.

♦ ♦ ♦

Be careful. Take good care of
property and materials.

♦ ♦ ♦

Be clean and orderly.

♦ ♦ ♦

Be punctual and industrious.

♦ ♦ ♦

Follow instructions willingly and
intelligently.

♦ ♦ ♦

Be agreeable and cooperative.



One of the safety boards. In the center is a light for each day of the month. White lights indicate the days on which there have been no accidents and red lights days on which accidents have occurred. At the left are the records of the various teams. At the right are the records of the various factory departments.

ment foreman. The size of these department committees depends on the number of employees in the department, a committee consisting of about 10 per cent of the employees of the department.

Group Meetings Held Once a Month

When the safety organization was first effected, three group meetings were held, during which the director of personnel explained the purpose of the organization and gave talks on the prevention of accidents. Now that the safety organization is functioning smoothly, the monthly group meetings are conducted by the group chairmen. These group meet-

ings are held once a month and are attended by all the workers in the group. All safety meetings are held during working hours.

The general safety committee of four meets once a week. At these meetings a list of every accident that occurred during the week is reviewed and later each group chairman checks back on the accidents in his group with the foreman of the department in which the accident occurred and with the employee injured, regardless of how slight the accident may have been. This is done on the theory that the difference between a major and a minor accident is only one of degree and that there might have been as much carelessness involved in a minor accident as in one that resulted in the more serious injury. The general committee also makes a complete inspection of the plant once a month, being accompanied through each department by the foreman of that department. Each departmental committee also holds a meeting once a month to review its record for the month and receive any information that the group supervisor may have to offer.

In order to maintain the greatest amount of interest in safety work three foremen serve as group supervisors for only one year. The next year they become group chairmen of the committee on waste. By replacing one set with three other foremen after a year's service, there is an increase each year in the number of foremen who have served as group chairmen, have developed an interest in safety work, are familiar with safety rules and are inclined to offer the heartiest cooperation to their successors. The general chairman holds over from year to year. Under the plan a safety organization that the management regards as highly efficient has been set up without the additional expense of having a safety director and perhaps assistants that would devote all their time to safety work.

The three group chairmen are sent each year to

Safety Campaign Greatly Decreases Accidents

	Total Accidents	Number of Accidents Resulting in Over One Week of Lost Time
1926		
No safety work beyond observance of laws requiring guarding of machinery	279	79
1927		
Safety work limited to supervision by foremen	156	45
1928		
Cooperation of employees in safety work	20	11
1929		
Safety work carried on under plant safety organization	10	6
1930—6 Months		
Continuation of safety work under plant organization	3	3

Employees number about 800, the average not showing much change during the years covered by the accident records.

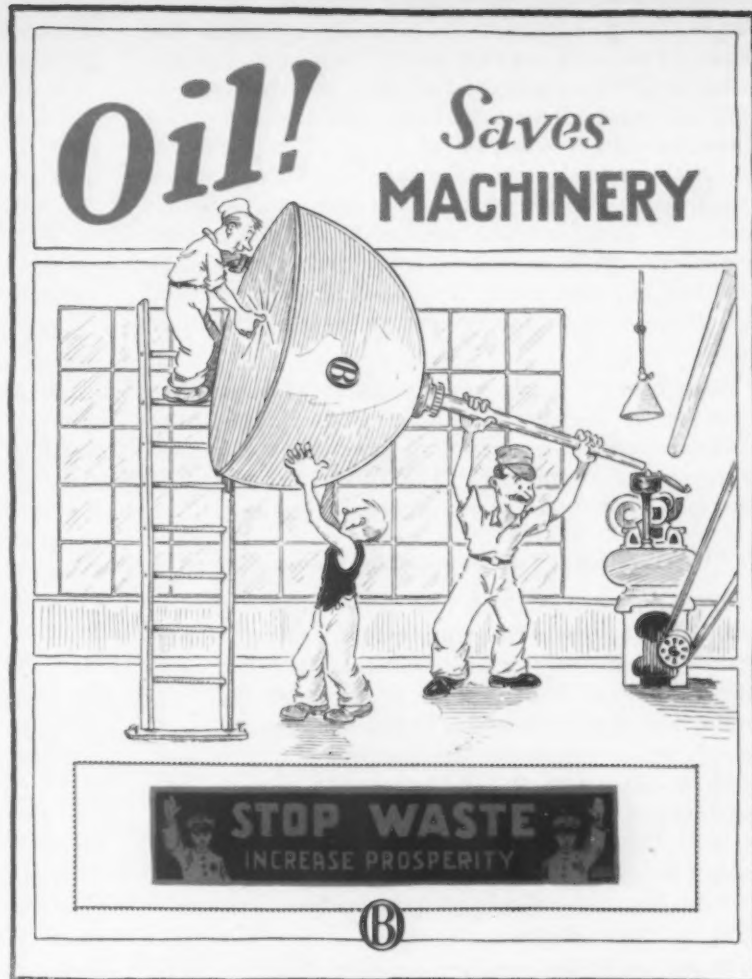
the meeting of the National Safety Council at the company's expense and the 40 or more members of the department committees are sent to the annual safety congress held under the auspices of the Ohio Industrial Commission.

Posters in Plant Stress Safety

Various methods are followed to maintain interest among the men in safety work. Attractive safety posters made in the plant are displayed here and there and, because these in their design always have local color, they are regarded as much more appealing than standardized safety posters, although a few of the latter are used.

A safety board is located at each of the two main entrances. On these lights are displayed for every day of the month—a white light denoting no accidents for the day and a red light accidents. Red and white lights also show the standing of each group or team for the month and year. In addition each department is listed with the number of days that it has operated without an accident since Jan. 17, 1928, when the plan was put into effect. This chart shows that a number of departments have not had an accident since that date. This display of accident records tends to maintain interest in the work and to arouse rivalry between groups and departments. The spirit of rivalry is also fostered by the award each year of a silver cup as a safety trophy to the one of the three groups that has had the fewest accidents during the year.

Located in the center of each department above



PROPER LUBRICANT—PROPERLY USED
SAVES MACHINERY

the main aisle is a flashlight that flashes as a bright star in a suspended metal mounting that bears the words, "Safety Pays."

Waste Elimination Campaign Resultful

The waste elimination activities include educational work under the direction of the group committee that served the previous year as a safety committee and headed by a member of the staff of the manufacturing superintendent. Standing in a conspicuous position in each department is a display board, attractive in appearance, that visually presents a message of waste elimination. Many of the boards bear the slogan, "Stop Waste—Increase Prosperity." Each department designed and built its own waste elimination board, and a prize cup was awarded to the department having the most attractive and appealing board. Attached to the boards are displays of broken small tools, parts and supplies, and adjoining are figures which show graphically the loss caused by the breaking of tools, the breaking of parts in handling, the upkeep of machinery and other items that can be included in factory waste. The educational training of the men in waste elimination, which is a part of the waste elimination program, includes explanations to the employees regarding the requirements of production and why parts, sometimes seemingly satisfactory, have to be rejected.

As evidence that this campaign, which was started Jan. 1, 1929, is bringing good results, the molding



Stop waste display board that won the first prize and was awarded the president's cup.

loss in the brass foundry due to rejected castings was reduced from 4.07 per cent in 1928 to 2.3 per cent last year. Deliveries from the factory to the warehouse in 1929 increased 17 per cent from 1928, but the actual operating factory expense or overhead was \$65,000 less last year than during the previous year. Included in these expenses were small tools and other supplies, repairs to machinery and equipment and non-productive labor. While an analysis of the reduction in overhead has not been made, the management is satisfied that the saving is due largely to the elimination of waste.

Two sets of rules, one for the foremen and the other for the workmen, designating their duties from a waste elimination viewpoint, have been established by the waste committee. The foreman's duties, as designated, are listed in an accompanying box.

President's Cup Awarded for Efficiency

As an incentive to the men, a president's cup was awarded last year to the departments making the best records for efficiency in waste elimination and in operation. This cup went to three departments, the first, second and third winners. Permanent possession of the cup will be given to the department that wins it twice in succession, and in that event a new cup will be offered as a prize. The cost department records will be used this year to determine the successful contestant for the cup, which will go to the department showing the greatest efficiency in operations as indicated by these records.

A feature of the company's system of management is the keeping of the record of each employee on ser-

vice cards that are made out every six months by the foreman. While this is separate from the waste elimination work, the same qualities are listed as essential for a successful worker as are specified for a workman from the waste elimination viewpoint. Consequently the purpose of the cards is to indicate whether the man has the same desired qualities that are listed as his duties from a waste elimination standpoint. In addition several questions relating to the man's personal affairs are listed on the service record cards.

The foreman answers the questions regarding the worker's record in the shop with a yes or no. The cards are made out in triplicate, one going to the director of personnel, one to the foreman and the third to the employee. If a "no" appears after the same question twice on a man's card, he is called on the carpet and may be discharged. The foreman is also held responsible and is asked to explain why the man has not improved. Perhaps the man is better fitted for a different class of work and can show a satisfactory record card if transferred to a different department.

The worker knows from his card what his shortcomings are in the eyes of his foreman and has an opportunity to mend his ways. Sometimes the employee objects to the grade given him by a foreman and threshes the matter out with the foreman and director of personnel.

The service cards are used in a spirit of helpfulness and as a means of aiding the men to do better work. The management finds there is only one type of man who cannot be helped—he is the one who will not help himself.

Duties of a Foreman at Ohio Brass Co. Plant

Have a clean and orderly department.

◆ ◆ ◆

Be in a receptive frame of mind to recognize waste when you see it or when it is pointed out to you.

◆ ◆ ◆

When waste is found, analyze for cause and eliminate the cause.

◆ ◆ ◆

Proper supervision of work and workers and good discipline.

◆ ◆ ◆

Advance planning of production, intelligent assignment of work, and proper instructions.

◆ ◆ ◆

Use proper machines, tools, materials and methods.

◆ ◆ ◆

Know the product and its service requirements.

◆ ◆ ◆

Show proper appreciation of good work and of cooperative effort.

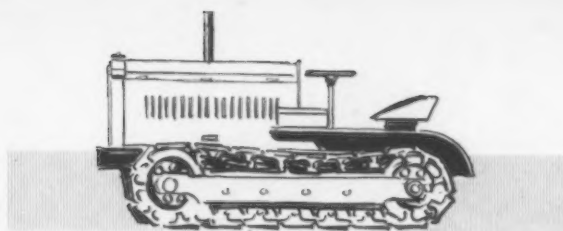
◆ ◆ ◆

Develop "shop pride," "department pride" and "individual pride" in workmanship.

◆ ◆ ◆

Be a real friend to your people and have in return their friendship and helpful cooperation.

◆ ◆ ◆



Heat-Treating Practice in Making Tractor Parts

INCREASED production, close temperature control, high quality of work, saving of floor space and reduction in handling labor have been effected by the installation of a continuous electric furnace for heat-treating parts for crawler type tractors at the plant of the Cleveland Tractor Co., Cleveland. The furnace is of a new chain belt conveyor type, built by the Electric Furnace Co.

This furnace is used for hardening transmission gears and the rollers, bushings and pins that, with the shoe, form the track shoe assembly, parts that are subjected to very hard and abrasive wear. The separate track shoe assemblies are joined together by pins forming a series track assembly.

Rollers Made of Steel Tubing

The rollers are made of seamless steel tubing, SAE 3120. Tubing, 1½ to 2½ in. outside diameters, is used depending on the type of tractor. This is cut to 4 to 11-in. lengths, then the outside diameter is turned and the inside diameter is broached, after which the pieces are carburized, hardened and drawn. The shoes are chrome steel castings that are heat treated in the foundry that supplies them. The bushings and pins were formerly made of an alloy or heat-treating steel, but recently this was changed to a plain low-carbon or carburizing steel, SAE 1020, to secure parts that, after carburizing and case hardening, have a harder surface. While the cost of this steel is lower than that of the alloy steel formerly used, this is offset by the increased cost of carburizing as compared with heat treating.

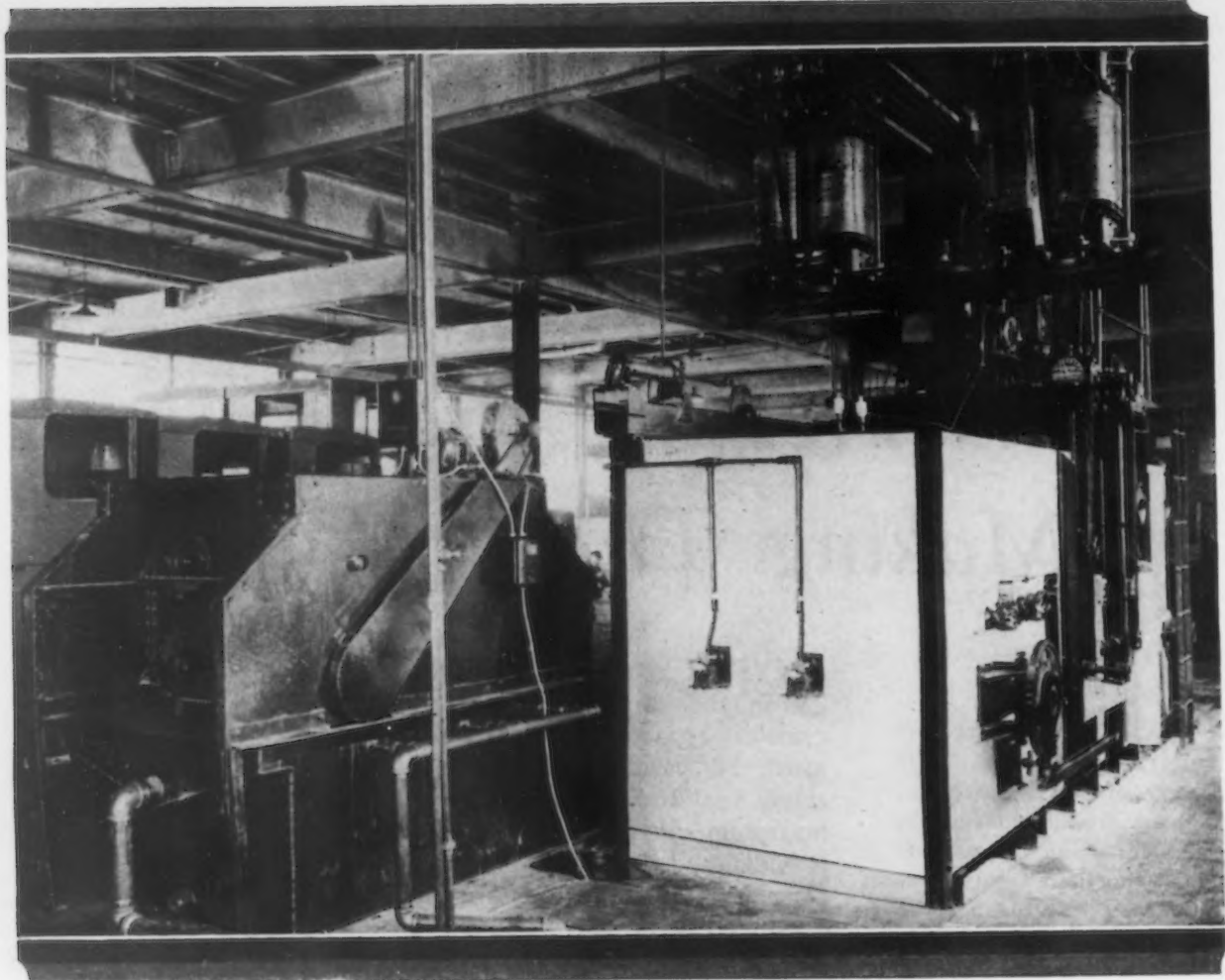
Another recent change of material was the adop-

SEVERAL alloy steels are used in the various parts of a crawler type tractor. These must be carefully and accurately heat treated to bring out maximum physical properties. It is claimed that larger output, closer control of temperature, combined with better quality, are obtained from the use of an electric furnace for heat treating. Also there is pointed out in this article the consequent saving of floor space and reduction of labor for handling. Details of the furnace and the heat treatment to which the various steels are subjected are also discussed.

tion of chrome-nickel-molybdenum steel in place of chrome-nickel steel, SAE 3145 for the rear axle drive shaft, which is subjected to very severe strains. The physical properties of the steel are improved by the molybdenum content, the tensile strength having been increased from 165,000 lb. per sq. in. to from 180,000 to 190,000 lb. Most gears are made of 3½ per cent nickel, 5 per cent nickel and nickel-chrome steel, SAE Nos. 2315, 2512 and 3310 respectively, and transmission drive shafts are made of nickel and nickel-chrome steel. Driving gears and lower truck wheel shafts are made of medium hard, plain carbon steel, the former, SAE 1045, and the latter, SAE 1035.

The continuous conveyor furnace, which is of 110-kw. capacity, has a flexible endless chain belt 23 in. wide with side flanges, the conveyor serving as a furnace hearth. It operates entirely within the furnace, thus reducing the heat loss to a minimum. The work is loaded directly on to this belt, carried through the furnace and removed through a side discharge door, the unloading being done with tongs when an individual quench is desired. An alloy steel chute, with a water cooled extension, is provided to permit work to be discharged directly from the conveyor into a water quench, but at present pieces are handled from the furnace by hand either to a water-quenching tank or to a special type, oil-quenching machine located at the side of the furnace.

The furnace is provided with variable speed transmission, giving a range of 20 to 120 min. in the heating chamber. With the schedules used in the plant there is a range of 30 to 90 min. in the time



Quenching machine is at rear of furnace and transformer switchboard and control instruments are placed on top of the furnace

the work is kept in the furnace. From 500 to 800 lb. are being heated in the furnace per hour.

The furnace chamber is divided into two zones, one for heating and the other for soaking, and provision is made to vary the heat input over a wide range in each zone as well as in the entire furnace. Heavy cast grids are mounted above and below the belt, insuring even heat distribution over the entire charge. The switchboard transformer and control equipment are mounted above the furnace to save space.

Oil-Quench Machine Provided With Conveyor

An oil-quenching machine is provided with an overhead, intermittently operated, conveyor consisting of a double strand chain with cross bars between the strands, each chain running over four sprockets. The gears or other parts to be oil quenched, on being drawn from the furnace, are placed upon hooks on the cross bars. When a cross bar is filled to capacity, the operator presses a button starting the driving mechanism. After proper travel, a limit switch stops the motor and the conveyor comes to a rest with the next cross bar in position for loading. Three sets of cooling coils are provided in the bottom of the tank. A hood is located above the tank for carrying away vapors.

Rollers and gears are subjected to double harden-

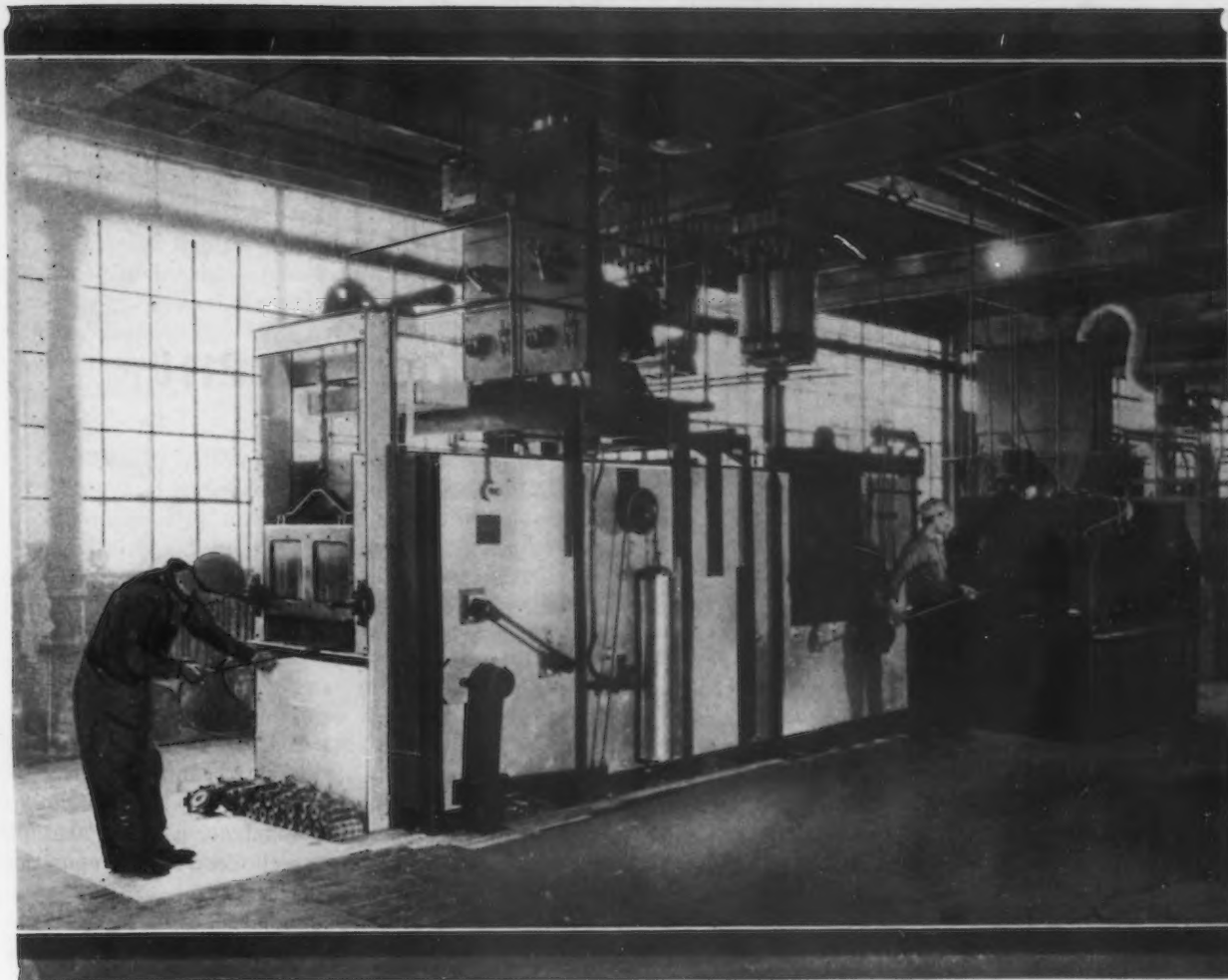
ing to secure the maximum hardness in the case and refinement in the core. They are first heated to 1475 to

1500 deg. Fahr., 1500 deg. being found to give the best results. They then are quenched in oil and reheated to 1375 to 1425 deg. and again quenched. Quenching the gears in oil instead of water assures a hard case and minimizes distortion.

Plain carbon steel bushings and pins are heated to 1425 to 1475 deg. Fahr., the lower temperature usually giving the best results. They are quenched in water to assure the maximum hardness on the case, a hardness that would not be secured by oil quenching. The parts are dropped into the quench tank individually, which assures uniform quenching.

The rear wheel drive shafts of chrome-nickel-molybdenum steel are given one heat treatment in a salt bath to avoid surface decarburizing. All long shafts either of alloy or carbon steel are heat treated in salt in pot furnaces in which they are kept from one to two hours, after which they are quenched, usually in oil. While in the furnace they are kept in a perpendicular position to assure the minimum amount of distortion. All alloy gears and shafts which are not carburized are drawn after hardening in Homo-type electric furnaces. After quenching and before drawing they are cleaned in a cleaning compound.

Steel having a carbon content of above 0.20 per



Parts are removed through a side door and, if oil quenched, are hung on the conveyor of a special oil-quenching machine shown at the right

cent is not carburized. Work that is carburized is drawn at 250 to 300 deg. in either a Homo furnace or

a salt bath. All small parts including bushings and pins are carburized in two rotary furnaces, fired with natural gas. Gears and larger parts are carburized in boxes in three oil-fired batch type furnaces. They are held at 1650 to 1700 deg. Fahr. for 12 to 18 hr., depending upon the depth of case required and then cooled in their boxes until they reach the temperature of 300 deg. or less.

Various Hardness Tests Used

On parts that are heat treated and not carburized a Brinell hardness range of from 300 to 600 is maintained. Carburized work requiring maximum hardness of case is given an individual file test as well as the scleroscope test. Other carburized work is given only the scleroscope test. All heat-treated work is given a 100 per cent inspection and only those that come up to the standards go to the assembly department. All steel, whether forgings, bars, tubing or castings, is analyzed in the laboratory to determine whether it conforms to the S.A.E. specifications.

Gears, transmission shaft and other movable parts that come in contact with oil are sand blasted after drawing to provide a clean surface. Two sand-blast machines for this work are located adjacent

to the continuous electric heat-treating furnace. All furnaces are controlled by Leeds & Northrup control

and recording instruments, which are located in a separate control room.

High-Grade Slags from Manganiferous Iron Ores

Because of the importance of manganese in making steel and because of our limited deposits of ferro-grade ore requiring simple methods of beneficiation, the North Central Experiment Station of the United States Bureau of Mines, in cooperation with the University of Minnesota, Minneapolis, has been conducting an extensive investigation of methods whereby it will be possible to produce ferromanganese from our large deposits of manganiferous iron ore.

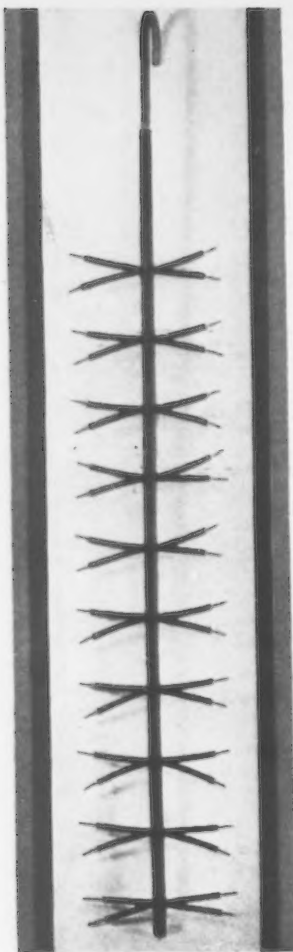
Recent tests conducted both in a small arc electric furnace and a small open-hearth furnace have shown that it is feasible to produce slags containing from 68 to 72 per cent manganous oxide, 6 to 10 per cent silica, under 0.2 per cent phosphorus, and 6 to 10 per cent ferrous oxide. Such slags are a decided improvement over those produced in previous tests. Further work with the electric furnace shows that it has several advantages over the open-hearth for producing artificial ferro-grade ore from high-phosphorus spiegel.

Rubber Coated Metal

Useful In

Plating Equipment

By GEORGE S. HERRICK



This rack for suspending small objects in the plating bath has been coated with rubber electrolytically deposited and then vulcanized.

AS demand of modern industry for corrosion resistant products increases, there is growing use of rubber as a coating for metals to resist acids. The rubber-lined and in some cases rubber-lined and covered tank for acids has been in use for a score of years, but recently a German process has been adopted commercially by rubber manufacturers, under which, on

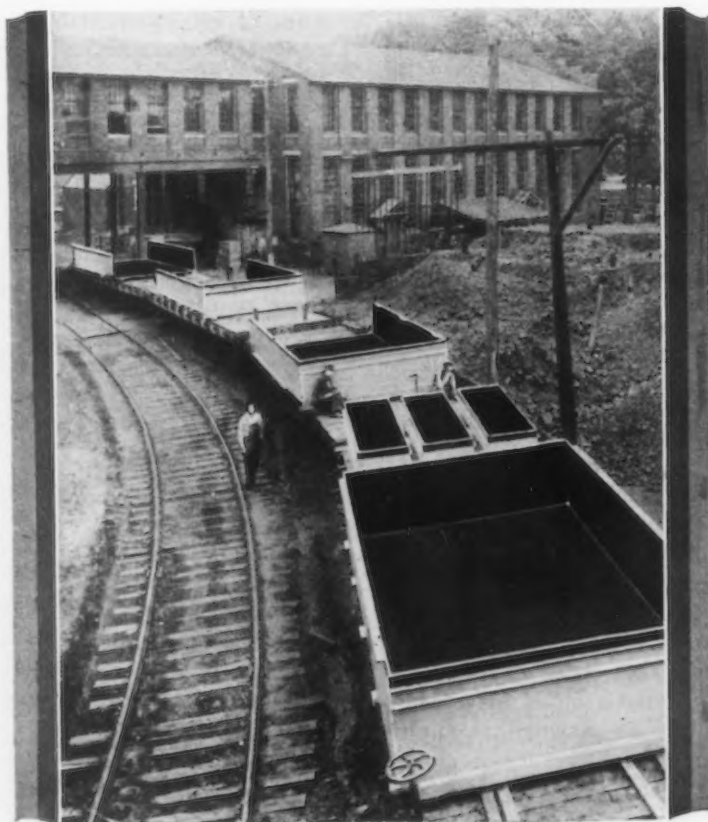
small and intricate metal articles, rubber is electrolytically deposited and thus given a highly resistant coating against acids.

Among the products being made with electrolytically deposited rubber coatings are racks for plating, one of which, manufactured by the American Hard Rubber Co., New York, is shown in the accompanying illustration. The rack itself is formed of a 1/4-in. square bar of bronze, to which copper wires are attached, and the entire rack is dipped in tin.

On the tinned surface, the rubber is electrolytically deposited. The coating is vulcanized, shrinking the rubber closely to the rack frame. The ends of the wires alone are left bare, to make electrical contact with the articles to be plated. It is claimed by the maker that the rubber provides a perfect insulation, prevents large loss of current in the bath, as when racks are used that are not coated with a non-conductor, and avoids repeated plating of the rack. These racks have been manufactured in various designs, depending upon the types of articles to be plated and the number it is possible to plate in a single bath.

Although the electrolytic deposition of rubber on steel, or a non-ferrous metal such as aluminum, tin, copper or brass, is highly desirable on small articles, especially those of intricate design, the hand application of sheet rubber is still the only method of satisfactorily applying rubber coating to large products, such as plating and other tanks to contain acids. The large steel tank in process of fabrication which appears in an accompanying illustration is an example of large scope coating for which electrolytic deposition cannot as yet be applied successfully.

In coating a tank by hand, the rubber, in sheets, usually 3/16 in. in thickness, is applied after fabrica-



The two ends and middle section of a large plating tank on the three rear cars are being shipped to an automobile manufacturer for plating motor car parts. When assembled, the tank will be about 10 ft. wide, 60 ft. long and 4 1/2 ft. deep.

tion of the product has otherwise been completed. The surface of the tank or other article to be coated is thoroughly cleaned, either by pickling, or sand blasting, it being essential to remove all traces of grease. Cement is then applied and the sheet rubber is rolled down on the cemented surface with hand rollers, so that all air is excluded.

Elimination of all air under the surface is essential, as a small bubble in a seam or joint will expand with heat and might result in a large and serious blister on the coated surface. Seams in the lining are made by lapping one edge over the other and rolling the two firmly together, unvulcanized rubber being plastic and adhesive, so that it forms a homogeneous seam.

The flanged outlets of a tank are completely lined, the lining being brought through the inside surface of the outlet and over the face of the flange. In rivetted tanks, or on a weld seam, the greatest care must be exercised to exclude all air from under lining. Consequently, each rivet head and weld seam must be treated with special care, the rivets in particular demanding individual treatment.

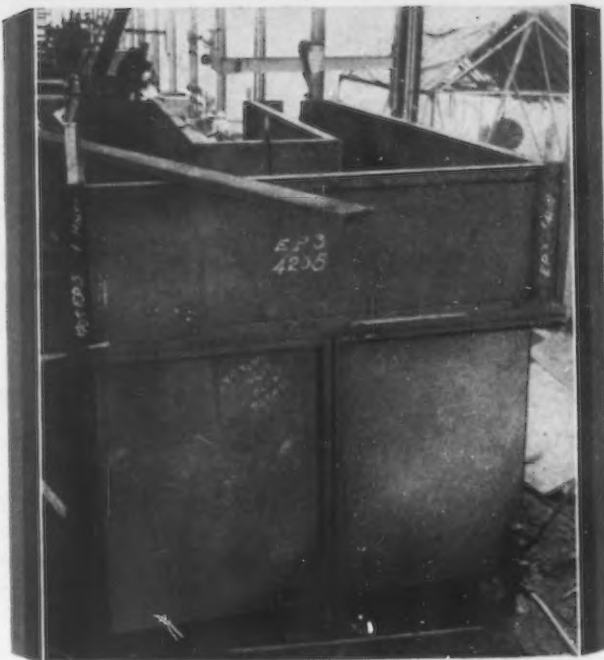
In the process of lining employed by the American Hard Rubber Co. on large tanks, there is interposed a relatively thin layer of soft rubber between the metal surface and the hard rubber lining, to serve as a binder.

Large Tanks Used in Plating

The metal plating industry is an extensive user of rubber lined tanks and uses some of the largest made. The trainload in the accompanying illustration serves as an example of the size of some of the plating tanks used in the automobile industry. From the parts which are being shipped on three flat cars a plating tank about 60 ft. long will be assembled. The sections



Prior to shipment, sectional rubber-lined tanks are assembled in the rubber company's plant. This tank, about 40 ft. long will be used for plating.



When fabrication is completed, this tank 12 ft. deep, to be used in pickling steel pipe, will be transported to the rubber company, which will line it by hand with 3/16 in. rubber sheets.

are bolted together and made leak-proof with soft rubber gaskets, which are vulcanized directly to the face of the flange.

The rubber coating on these tanks has an adherence of about 300 lb. per sq. in. and tanks of this type have been found to withstand successfully temperatures up to 212 deg. Fahr. This is more than sufficient for ordinary uses and the adherence even serves for the lining in tanks working under substantially full vacuum. While certain of the earlier rubber-lined tanks constructed about a decade ago developed cracks when subjected to continued heating and cooling, this trouble has been corrected by using a hard rubber lining of a tough leathery nature with higher elongation (about 16 per cent). It was found that an extremely hard lining would not expand and contract as much as the steel to which it was fixed, while the softer lining was unaffected.

In the past few years rubber lined tanks have been used under more severe acid conditions than recommended by the makers and without serious depreciation. They withstand most of the acids and solutions commercially used, being affected principally by the solvents of rubber, such as ether, benzol, acetone and aniline.

Average farm wages at the peak in 1920 were 135 per cent above 1914. The depression of 1921 brought them down very sharply to 47 per cent above 1914. But, according to the National Industrial Conference Board, New York, in 1929 farm wages had increased to only 67 per cent over 1914 while the weekly earnings in manufacturing had risen 125 per cent above 1914. One compensation is the farmer's hired hand shares the family life and receives some compensation in this way.

Scientific Control of Steel

By V. H. LAWRENCE

*Metallurgical Engineer
Alan Wood Steel Co.
Conshohocken, Pa.*

THE Alan Wood Steel Co. is conducting a business at Conshohocken, near Norristown, Pa., that was established as the Alan Wood Iron & Steel Co. in 1826. Activities in the old furnaces and forges actually commenced some 30 years before that time. Consequently the company should have an unrivaled body of tradition.

Yet in 1925, 100 years after starting business under the firm name, the entire operation of the recently modernized and rebuilt plant was intrusted to a staff of relatively young men from various pioneering plants west of the Allegheny Mountains, who lost little time in installing a system of scientific control of the steel-making operations, a system probably unmatched in any American plant for its effectiveness.

The first requisite of this system was accurate and intelligent records of metallurgical practices, such records being the prime necessity to insure department heads that the new practices they were inaugurating would accurately be carried out. The impetus for a metallurgical recording system, therefore, came from the operating men, who delegated the keeping of these records to the metallurgical department.

To this extent the practice was identical with many similar plants. But it was soon found that records alone were only partially effective; convenient for duplicating previous orders, or in post mortem conferences, but unwieldy in immediate effectiveness.

To make the application of these records effective four steps, properly tied in, seem essential. These steps are as follows:

1. Detailed records
2. Detailed recommended procedures
3. Immediate check from record to program and identification of material varying from the program
4. Metallurgical investigation of material segregated under Item 3

The detailed records

Order on steel works, upper right, issued by sales department, calls for steel of definite specification, to be rolled and trimmed in a specified manner.

Rolling record, across bottom of pages, covers operations from the time the ingots were stripped until the blooms were placed in annealing pits (Item 7, in Metallurgical Requirements). Observations of surface conditions, temperatures and other pertinent facts are entered.

mentioned above were already available, as were the recommended procedures, except for detailing them on paper.

To obtain the immediate check from record to program, the metallurgical observers were intrusted with authority to decide whether the practice followed the program and to institute proceedings immediately to check up on the effect of variations or to divert the steel in process. This allowed a thorough investigation prior to shipment of any such steel, and sometimes proved that variations from established practice offered improvements in quality or yield which might later be inaugurated into standard practice. The system, therefore, became both scientific and flexible, valuable practices being adopted and others discarded toward the ultimate goal of high quality at low cost.

The metallurgical investigations of the material,

ALAN V

1000 8-11-28 FORM 51 W

ORDER NO 315		CUSTOMER
ANALYSIS SPECIFIED		C032-636 MNAso-07 P O. 03 S O
OPEN HEARTH RECORD		20% inv. ingots PRODUCT
Grade.....A....	Size 23 X 7.5	Total Wt.
Method of Casting...H.T....	Size.....Wt.....	Total Wt.
Condition of Moulds..Coke..	Size.....Wt.....	Total Wt.
Shut Off.....O.K....	Size.....Wt.....	Total Wt.

INGOT #	PIT NO.	PIT LOCATION	CHARGED POSITION	TIME STRIPPED	LEFT O. H.	ARRIV MIL
4	3	Row 2		7 ⁴⁵ p.m.	7 ²⁵ a.m.	7 ⁴⁵ p.
4	4	"		{	{	{
1	1	Row 3				
6	2	Row 5		7 ⁴⁵ p.m.	7 ⁴⁵ p.m.	7 ⁴⁵ p.
5 6/8	1	"		{	{	{

ROLL RECORD

ROLL NO.'S 66
ROLL PASSED Roughing 23.9m
Rollback 19"
For Intermediate 17"

2nd Intermediate 7.0m
Finish 4.2m

Condition of Finishing Pass

OK

INGOT NO. SIZE

2, 23 x 7.5

Production

INSTITUTING close control in all processes in the manufacture of steel, from raw material to rolled bloom, has permitted unusually close adherence to customers' requirements and, at the same time, reduced the previous tonnage losses between ingot and billet shipment. Observers under the metallurgical department perform functions similar to those of inspectors in machine and foundry work, and thus serve to prevent practices found harmful and to keep alert the whole producing personnel.

ALAN WOOD STEEL COMPANY
STEEL WORKS DEPARTMENT
CONSHOHOCKEN, April 28, 1930

FOR SHIP TO
VIA Reading Company

MILL ORDER NO. 315
BUYER'S ORDER NO. 4/28/30
(CODE NO. 651)

ANALYSIS		FREIGHT	
CARBON	MANGANESE	PHOSPHORUS	SULPHUR
.50 to .60	.40 to .80	.04 MAX.	.04 MAX.

SILICON .10 to .50
CHROME .80 to 1.25
VANADIUM .15 min. .18 - .21

LOAD BILLETS IN SUCH A MANNER THAT CUSTOMER CAN GET CHAIN UNDERNEATH.

INVOICE AS "AN" O. H. CHROME VANADIUM STEEL FORGING BILLETS

ONE HEAT

one-half 7" x 7"

one-quarter 11" x 11"

one-quarter 12" x 12"

TO BE ROLLED AS FOLLOWS

x full ingot weight cropped out in half.

x full ingot weight cropped

x full ingot weight cropped.

INGOTS HT
CARBON 32/38
MANG 50/70
PHOS 0.3
SUL 25/30
SIL 18/22

GRADE A H. T. ONLY

Refer to Spec. Sheet #518

8183
5/6/30

RECEIVED
APR 28 2PM
METALL. DEPT.

WOOD STEEL COMPANY ROLLING RECORD Blooming MILL

OBSERVER Wolf ROLLER Morgan HEATERS Spring-Martin DATE ROLLED 5/1/30 HEAT NO. 8183

035 SILO 16-034 C. 0.45-1.10 ANALYSIS APPLIED C. 0.33 MN 0.61 P. 0.019 S. 0.033 SILO 0.71 C. 0.67 Mn. 0.18

1758 P.M.

WEATHER CONDITIONS		ANNEALING RECORD		CHIPPING RECORD	
At Strip	After Rolling	Condition of Pits	Time Charged	No. Pieces Chipped	Chipping Hours per ton
Temp. 60 deg.	60 deg.	Time Charged 3.25 P.M.	Temperature Charged 1790 deg.	Remarks	
Humidity Clear	Clear	Time Uncovered			

TIME CHARGED	DELAYS & CAUSES	PIT TEMPERATURES	DRAWING TEMP.	TEMP. 1st EDGING	TEMP. FINISH	SIZE ROLLED	DISCARD	REMARKS
7:52 pm		1st and 2nd ingots showed tears at center also at butt. Good surface - few scattered pebbles. Good rolling. Evenly heated.		2180	2020		Bottom	
7:54 pm		1st ingot showed tear at center, also at butt. 2nd ingot showed tear at center, also at butt. Should 3 and 4 be central; 5 and 6 at butt.		2180	2050	23 x 23	18 In.	
7:55 pm		OK		2190	2040		Top	
8:00 pm		1st and 2nd ingots showed tear at center and butt. All good surface - evenly heated.		2200	2030		12 In. below 74.4	
8:05 pm		1st and 2nd showed tear at center - also at butt. Few scattered pebbles. Good rolling. Evenly heated.		2180	2040			Roller -
		Heated, rolling at 1500 deg.; finished at 1600 deg.						11 - 7 In. x 7 In.
		Roller, butt joint steel worked well.						5 - 11 In. x 11 In.
		Temperatures OK. Slag not excessive.						5 - 12 In. x 12 In.
		Sheared at 1900 deg.						
		Placed 7 In. x 7 In. in ash pit at 2:45 a.m. at 1740 deg. Covered with ash at 3:00 a.m. Placed in ash pit at 3:00 a.m. in ash pit at 3:00 a.m. Put in ash pit at 3:00 a.m. at 1650 deg.						

ROLLING PASSES—FIGURES INDICATE DIAL READING. "O" INDICATES 90° TURN "V" INDICATES CHANGE PASS

ROLLING PASSES																SIZE FINISHED
1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	7 In. x 7 In.
2 1/4	6	5	3 1/4	V	7 1/2	6 1/2	5 1/4	4 1/4	3 1/4	O	3 1/4	3 1/4	O	3 1/4		

constituting the fourth step in the program, are those investigations common in metallurgical practice, chemical checks, deep etch, physical tests, microscopic examination, etc. But in this case they were applied before shipment and not after rejection.

Symbols Designate Methods of Manufacture

In instituting detailed procedure plans it was realized that steel of identical analysis might be entirely suitable for one requirement and unsuitable for another. Seven standard methods of manufacture were ultimately decided upon, each one designated by a symbol and each generally suitable for one type of work, welding, carburizing, forging, drawing, galvanizing, etc. An additional symbol was introduced for special practice, such as might be decided upon for some particular purpose not in regular use.

These symbols were not established as descending degrees of quality, but as adherence to a particular established formula, any variation from the formula being designated by the algebraic symbol "x" requiring a full investigation before application on any order. These grades were based upon adherence to many points covering chemical analysis; furnace charge; condition of the furnace, ladle and molds; adherence to a predetermined line-up as to additions; temperatures and times; slag appearance

and analysis; metal appearance and mold action in the case of "open" steels.

These procedures are too detailed and voluminous for publication herewith and, while established with a knowledge that steel cannot be made on paper, rely on the observers' judgment as to variations which may or may not affect the suitability for the purpose intended.

Knowing the purpose for which the material is ordered, which is developed by conference with the sales department or by personal investigation, the detailing of practice and application of suitable steel becomes relatively simple. All orders pass through the metallurgical department before going to the mill. At that time metallurgical instructions are marked on or affixed to the order, stating the acceptable chemical ladle analysis to obtain satisfactory checks, the desired practice by the same symbol by which this practice would be graded during manufacture, and detailing further manufacturing practices where it is found necessary to be more specific.

Observers Follow the Steel as Made and Rolled

To check up on the accuracy with which these instructions are carried out, observers are placed in each department, responsible directly to the metallurgist, who checks up on the operators continuously. For instance, in the open-hearth department, young engineers are employed on each shift, who record all operations on the furnaces: the time of the various additions, the temperature of the furnace at intervals, the time and analysis of all samples, the temperature of the metal stream at tapping, temperatures at start and end of teeming, the time of teeming and stripping each ingot, condition of banks and bottom of furnace, ladle skull, and any event which might have appreciable influence on a heat, or would make even a single ingot a "special."

Grading the Heats

The heat is then graded according to the procedure followed and it is only necessary for the production department to apply a heat graded (for instance) "F" to an order calling for an "F" in the metallurgical department to insure the application of steel made according to the best judgment of the time in the manner most suitable for the particular purpose intended.

In addition to building up an alertness among the open-hearth men, the free use of optical pyrometers has educated the eyes of the melters and they are now much more accurate in the judgment of steel and furnace temperatures. Constant comparison of visual estimation with pyrometric results is thus similar to the training the melters acquire in

42518

Refer to Order No. <u>315</u>	Customer <u> </u>	Type <u>6185</u>
Carbon <u>32/38</u>	Mn. <u>50/70</u>	Phos. <u>03</u>
Sul. <u>035</u>	Sil. <u>11/22</u>	Cr. <u>95/22</u>
Ni. <u>-</u>	Vd. <u>18/20</u>	

ANALYSIS

THE FOLLOWING PROCEDURE IS DESIRED

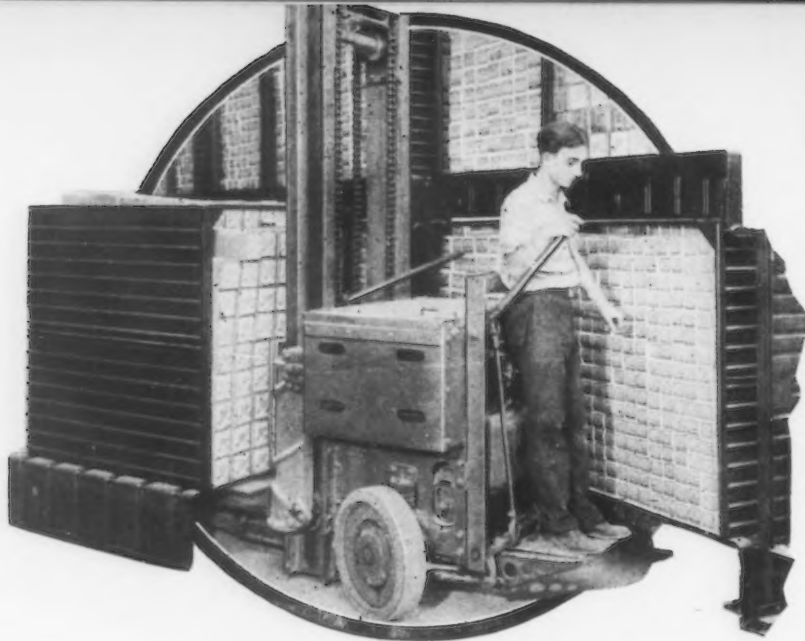
<p>"A" - HOT INGOTS</p> <p>(✓) 1. When ordering on Open Hearth refer personally to O.H. Supt. regarding special practices..</p> <p>() 2. Ingots to be charged hot as possible from Open Hearth. Delay of over 30 minutes from stripping to charging should be investigated.</p> <p>Delay <u> </u></p> <p>(✓) 3. Heat will be followed by Met. Observer Refer to him for tapping and stripping time.</p> <p>(✓) 4. To be carefully heated and thoroughly soaked before rolling. Minimum time in soaking pits <u>4</u> Hours.</p> <p>(✓) 5. Desired rolling temperature <u>2100/2200</u></p> <p>() 6. To be double converted. Roll to <u> </u> section and ship.</p> <p>(✓) 7. Anneal after initial rolling. Leave in pits <u>48</u> Hours.</p> <p>() 8. Cool in yard protected from rain & snow</p> <p>() 9. Cool on hot bed and shear cold.</p> <p>() 10. Shear cold. To be insp. by Met. Dept.</p> <p>(✓) 11. Cut tests, size <u>7" X 7"</u>, from top, for Machine Shop. Etch 6" long, - Step down 12" long - Physical and etch 12" long.</p> <p>() 12. Cut tests, size <u>7" X 7"</u>, from bottom, for Machine Shop. Etch 6" long, - Step down 12" long - Physical and etch 12" long.</p> <p>(✓) 13. Do not ship until report on etch tests received G.K. to ship before report on etch tests received.</p> <p>() 14. Chipping</p> <p>(✓) 15. Drilling. Drill <u>2</u> tops, and <u>2</u> bottoms for Laboratory.</p> <p>() 16. Cold stamping NOTE:- MUST BE #3 OR BETTER ETCH TEST</p>	<p>"B" - COLD INGOTS (Notify Met. Observer when ready to charge)</p> <p>() 1. To be rolled from heat <u> </u></p> <p>C. <u> </u> Sil. <u> </u></p> <p>Mn. <u> </u> Cr. <u> </u></p> <p>S. <u> </u> Ni. <u> </u></p> <p>O.K. By <u> </u></p> <p>() 2. Warm up around pits from <u> </u> to <u> </u></p> <p>() 3. Charge into pre-cooled pits Not over <u> </u> ° F.</p> <p>Soak <u> </u> Hours.</p> <p>() 4. Transfer to hot pits, heat to <u> </u> ° not less than <u> </u> Hrs., soak hours and roll.</p> <p>() 5. Desired rolling temperature <u> </u></p> <p>() 6. Desired finishing temperature <u> </u></p> <p>() 7. Anneal after initial rolling. Leave in pits <u> </u> Hours.</p> <p>() 8. Cool in yard protected from rain & snow</p> <p>() 9. Cool on hot bed and shear cold.</p> <p>() 10. Shear cold. To be insp. by Met. Dept.</p> <p>NOTE:- KEEP LAST INGOT POURED AS SPECIAL FOR V & SEGREGATION</p>
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[illegible]

The Iron Age, September 4, 1930—623

How the Electric the Hand

By C. B. CROCKETT
Secretary,
Industrial Truck Association

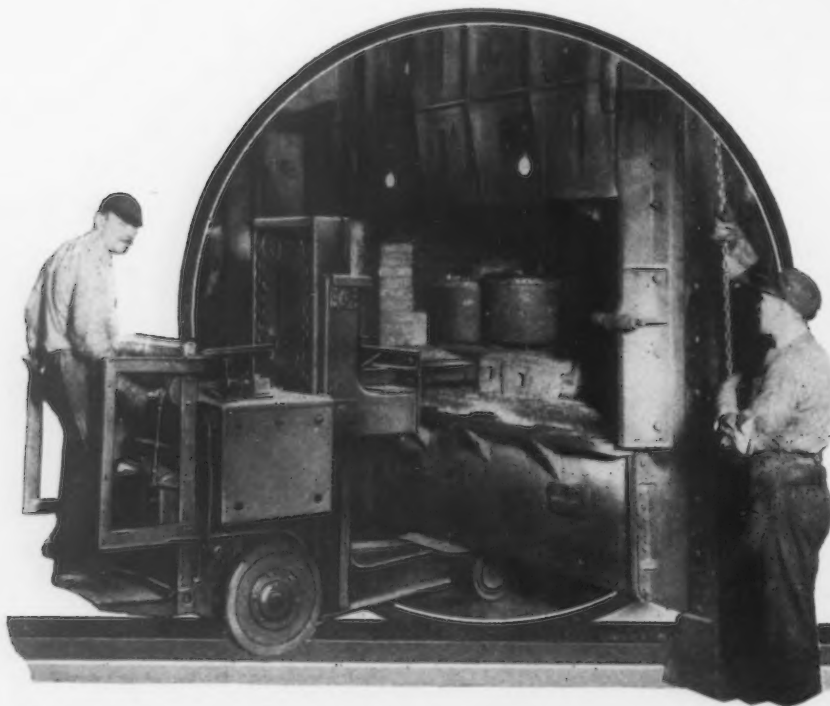
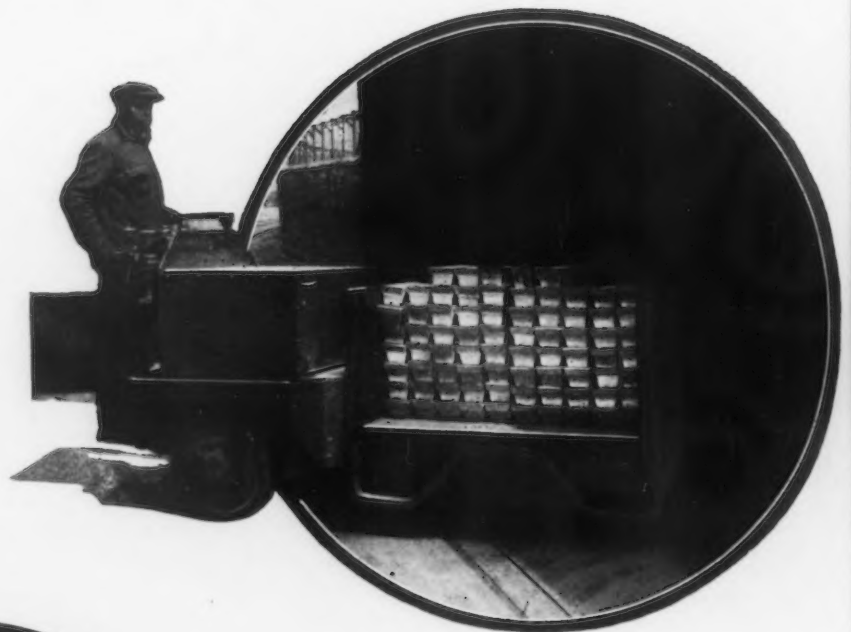


Lionel Corporation, Irvington, N. J.:

THE manufacture of Lionel toy trains, being of a highly seasonal character, requires an efficient warehousing operation. Electric high lift trucks with skid containers eliminate the necessity for any permanent shelving in the warehouse. Storage space has been doubled and the installation of the trucks shows a gross saving of \$7,200 per year.

Magnus Metals Co., Chicago:

THIS company has gone extensively into the shipment of its product on skids. In the shipment of journal bronzes to railroads, the handling cost has been reduced approximately 80 per cent.

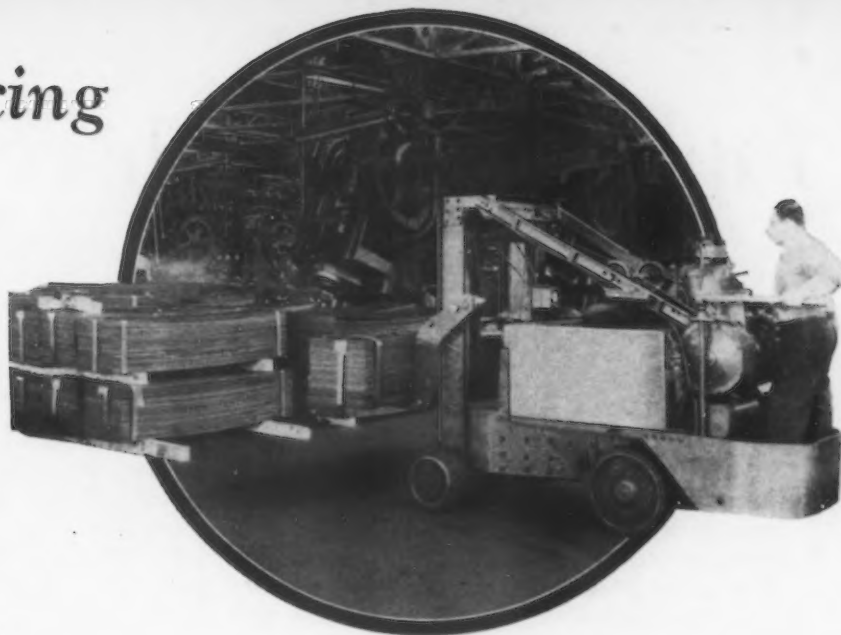


Reo Motor Car Co., Lansing, Mich.:

ONE electric industrial truck now serves 11 carburizing furnaces, handling seven pots at a time which weigh from 300 to 500 lb. apiece. The furnace is now recharged in 2 min. and a temperature of 1900 deg. Fahr. held in the heating chamber. It formerly took seven men to charge these furnaces and with cooling and reheating time there was a total loss of nearly 3 hr. The truck operates 24 hr. a day, saving six men per 8-hr. shift, the aggregate savings being in the neighborhood of \$13,000 for direct labor alone.

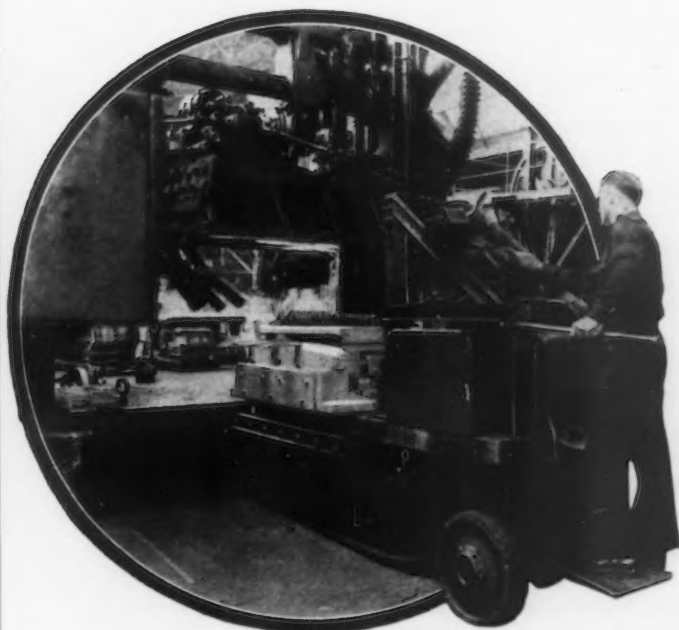
Electric Truck Is Reducing Handling Cost

Specific Operating Data
From Six Companies Reveal
Large Profit Possibilities



Gear and Axle Division,
Chevrolet Motor Car Co., Detroit:

STEEL sheets up to 96 in. in length are handled in 8000-lb. bundles by a new heavy-duty fork type truck which loads the bundles on trailers and they are then hauled to storage by electric tractor. The system introduced by the fork type truck and two tractors has reduced the cost of unloading, storing and stacking to less than 2c. a ton.

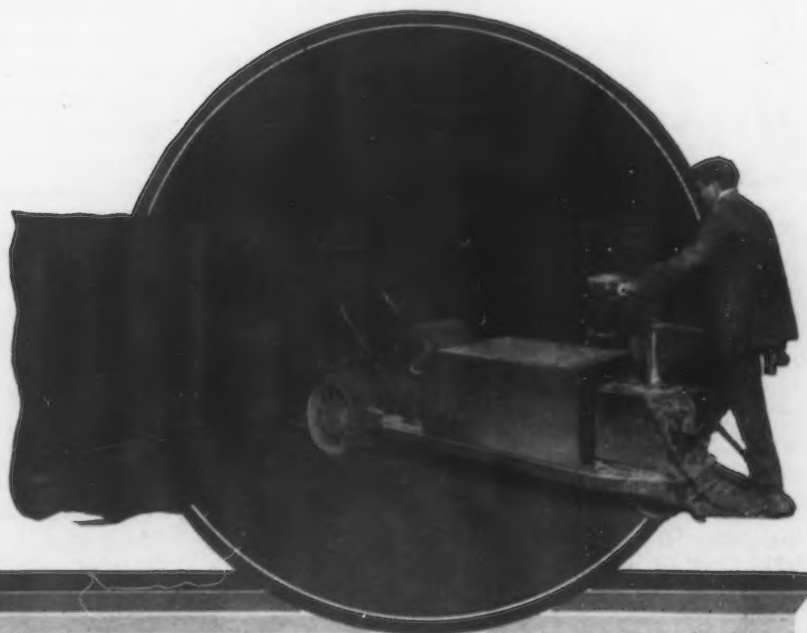


Edward G. Budd Mfg. Co.,
Philadelphia:

HIGH lift electric trucks are employed in this plant for die changing of presses for automobile bodies. The reduction of labor cost and of idle press time, according to the management of this plant, has amounted to \$112 a day for one truck.

Erie Malleable Iron Co., Erie, Pa.:

SPECIAL electric industrial trucks handle stacks of annealing pots. Two operators with two trucks move 900 stacks of pots in 9 hr. 13 min. 480 of these 3300-lb. stacks were transferred 300 ft. and 420 transferred 80 ft. This record shows the handling of approximately $4\frac{1}{4}$ tons per man per minute. Additional savings were secured in the reduction of lost heat and the increase of effective furnace time.



Forgings Hardened Without

H EAT treatment of locomotive forgings introduces some problems arising from the large average size of the pieces, problems seldom encountered when handling the parts going into motor cars and smaller machinery. When, in addition to being bulky and heavy, the piece must be held to close dimensional limits and large areas of the finished surface must be uniformly glass hard, yet with ends soft enough for drilling or reaming bolt holes, the operation becomes complicated enough to warrant description in some detail. Case-hardening of crosshead guides, as done at the Eddystone shops of Baldwin Locomotive Works, is a case in point.

Not all engines, by any means, are equipped with heat treated or alloy steel forgings. In fact locomotive designers generally have favored the tried and true wrought iron and low and medium carbon steels, although in recent years the use of heat treated parts has been growing. Case-hardened pieces are usually avoided because the hard surface is brittle and cracks under heavy impact, and a crack once started extends

readily through the low carbon center to complete failure. The conventional practice on axles, pins, and slides therefore calls for medium carbon steels so treated as to be as uniform in structure as possible, surface to center, and the wear is taken care of by adjustable bronze bushings of generous proportions.

Maintenance of smooth running fits on crosshead guides is notoriously expensive. The pressure varies as the angle of the connecting rod changes, continuously with every turn of the driving wheels, and the resulting friction in time produces a set of guides, tight at the ends of the piston travel, but loose in the center—a condition

which cannot be corrected by shims in the crosshead. Furthermore, wear is unusually rapid, for the wearing surfaces are fully exposed to all the air-blown dirt and grit. Glass hard surfaces produced by case-hardening the faces and edges of the guides are expected to throw practically all the wear into the softer material of the crosshead, which can be designed for ready adjustment.

Hot Guides Hung From One End

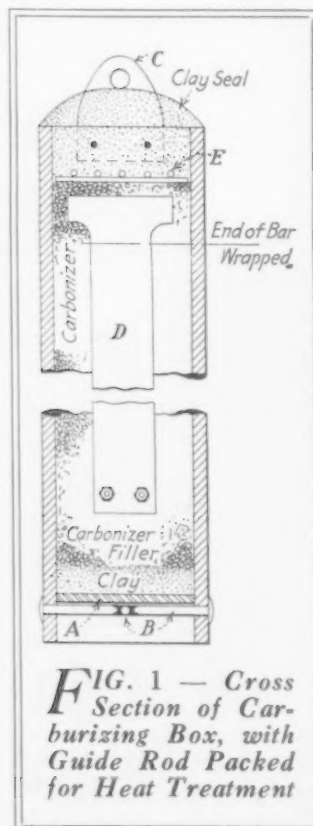
Crosshead guides, as used in this practice, are machined forgings of low carbon, acid open-hearth steel. Representative dimensions would be approximately 6 ft. long, 7 in. wide, 3 in. thick at the ends, increasing gradually to 5 in. at the center (the form of a beam of uniform strength). After forging, the guide is cooled and then thoroughly annealed to remove all internal strains. It is then machined all over and holes drilled at either end for bolting to its supports.

To avoid bending and warping, all heating, quenching and handling is done with the steel bar standing on end. Each bar is packed in its individual pot—a large iron pipe—and is stood on end during the carburization heat. After reheating for quenching, the upper end is gripped by a clamp or tong, the bar lifted up through the furnace roof by an overhead crane and lowered into a vertical quenching tank. Final inspection in the heat treatment department involves scraping the entire surface to search out any soft spots, and inspection after grinding is done with scleroscope.

It has been found that even with the best care a guide with cross-section a true rectangle will come from the hardening quench with the surfaces slightly bowed (the center bulged out and the corner edges drawn in). To allow for this the wearing surfaces are milled with a slight concavity to a straight edge placed crosswise. When this allowance is correctly made, final grinding of the hardened wearing surfaces to precise planes will remove less than 1/64 in. of metal at any place.

Carburizing Pots Made From Cast Iron Water Pipe

Simple, home-made equipment is used for these operations, and is producing uniformly satisfactory results. Carburizing pots are made of 16-in. cast iron water pipe about 10 ft. long. As shown in the sketch, the bottom is a tight-fitting steel plate *A*, welded to a pair of crossed steel bars *B*, the latter thrust through holes drilled through the pipe wall and riveted over. Three inches of clay are then tamped in to seal the



Warping

HOME-MADE equipment was used for carburizing, yet the pieces treated measured 6 ft. long. Ten-foot lengths of 16-in. cast iron pipe served for the pots and three foundry flasks 8 ft. in diameter provided the furnace structure, giving space for six of the pots at one time. Notable success has been achieved in both the hardening practice and in the furnace performance

bottom against slight leaks. Lifting ears *C* are bolted to the top of the pot, which is just high enough to project through the top of the furnace arch.

In packing, about 6 in. of granular commercial carburizer is placed in the bottom, then the guide rod *D* lowered in place, centered and the pot filled to near the top. Three 1½ x 3-in. steel bars of the same chemical composition are also packed in each pot, to act as "spies," one long enough to extend from the bottom up through the seal. Frequently, also, a long pyrometer protection tube reaches from top to bottom. On top of the carburizer is placed a lattice of steel rods *E*, crisscross, to form the bottom of a heaped clay cover.

Holes drilled in the ends of the guide bar are filled with bolts machined to a tight fit, and thus kept soft for reaming upon erection. Sometimes one whole end is to be kept soft; it would be wrapped with asbestos rope and mudded over with clay to prevent access to the carbonaceous filling matter and gases.

Furnace Is Bottom-Fired With Oil

A sketch of the furnace is given in Fig. 2. Three old foundry flasks *A*, 8 ft. diameter inside, form the casing. A 4-in. layer of fire bricks *B* is laid on the bottom, on which six carburizing boxes *C* may be placed, each resting on a clay tile *D*. The casing is lined with 9-in. fire brick *E*. A domed roof *F* closes the top, except for round holes through which the boxes slide. Any clearance or crack is mudded shut, so the roof is fairly tight. A working platform of steel plate it built around the furnace at a level of 4 ft. below the top.

The furnace is fired with two small oil burners *G*, set in shallow pits diametrically opposite each other. The firing rate and the proportions of the chambers

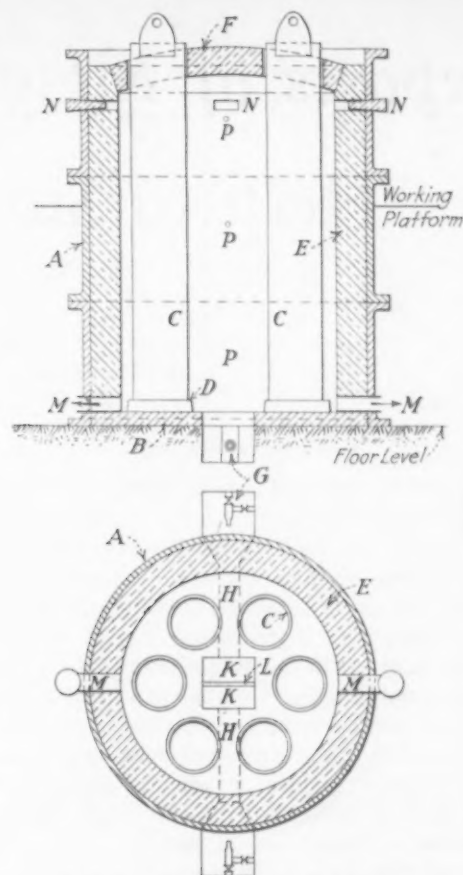


FIG. 2 — Plan and Elevation of Carburizing Furnace Made Up of Foundry Flasks

H are such that combustion is practically complete by the time the flame enters the central pit *K*. The hot gases strike either side of the tile baffle *L*, and are deflected up into the chamber and circulate about the boxes, finally going to waste through flues *M* at the floor level, into small, low stacks, giving a very slight draft.

A remarkable uniformity of temperature is produced by means of a series of vents *N* just under the dome. When the furnace is operating normally these would be closed rather snugly by tiles. But if the top one of the pyrometers *P* reads a little low, or if observation indicates that one region of the furnace is a little cool, the corresponding tiles are loosened and some of the hot gases in the furnace are exhausted directly to the air through that vent, thus bringing up the top temperature rapidly in that region. It is the operator's duty to read each pyrometer four times an hour, and no more than 15 deg. Fahr. difference, top to bottom, is permissible during soaking heats.

Furnace Sealed When Spy Bar Shows Deep Case

Six guides are treated at one time in this furnace. A cycle of operations starts by packing each one in its own box. The boxes are lowered into the furnace by an overhead crane, and the space between box and roof mudded up. In about 12 to 13 hr. of firing the

(Concluded on page 675)

Exports of Metal-Working Machinery

Help to Stabilize Depressions

By W. H. RASTALL

Bureau of Foreign and Domestic Commerce, Washington

DURING the period from 1905 to 1910 we manufactured mainly electric cranes, hoists, and hand cranes. Those were years of either feast or famine because the crane business was one of the first to suffer when business conditions in the country were bad. I therefore looked around for something that could be manufactured in our shops and which would furnish steadier work for our shops." Henry Harnischfeger, of the Harnischfeger Corporation, Milwaukee, thus describes how the machinery industry is either prince or pauper, depending upon whether we enjoy prosperity or suffer depression. The equipment industries all feel the same business fluctuations that harass the management of these enterprises, either through excessive demand when booms are at their peak, or through long, lean, hungry years when business is depressed.

Although these evils have long been recognized, we believe they never have been measured heretofore, but at the National Machine Tool Builders' Association convention last spring, the general manager, E. F. DuBrul, submitted a curve showing the variation in orders received during the past 11 years as reported to that association by its members. This curve was published in *THE IRON AGE*, May 29, 1930,

page 1619, and is reproduced as curve "B" in the accompanying chart.

In 1919 and 1920, demand was unusually active under the influence of post-armistice boom; immediately thereafter there was a most abnormal decline, the low point being reached late in 1921. This in turn was followed by a long period of recovery punctuated by less severe depressions and illustrating a business cycle with low points occurring with surprising regularity in the late summer or early autumn of every third year.

For purposes of comparison, curve "A" has been added to this diagram in order to show at similar scale the fluctuations experienced by industry generally, and for this purpose we have selected the index of industrial production as compiled by the Federal Reserve Board, using its "unadjusted total by manufactures." These returns are published regularly in the *Survey of Current Business*, and the index is described fully in the *Federal Reserve Bulletin* for February and March, 1927.

From the strictly technical point of view, this comparison might be criticized, for in many senses these indexes are not comparable, notwithstanding which it is felt that the comparison furnishes much that is interesting. The machine tool builders' curve is plotted on a scale such that the average for 1922, 1923, 1924 gives an index of 100. In applying the Federal Reserve data, this scale was disregarded, the curve merely being so located as to bring the average

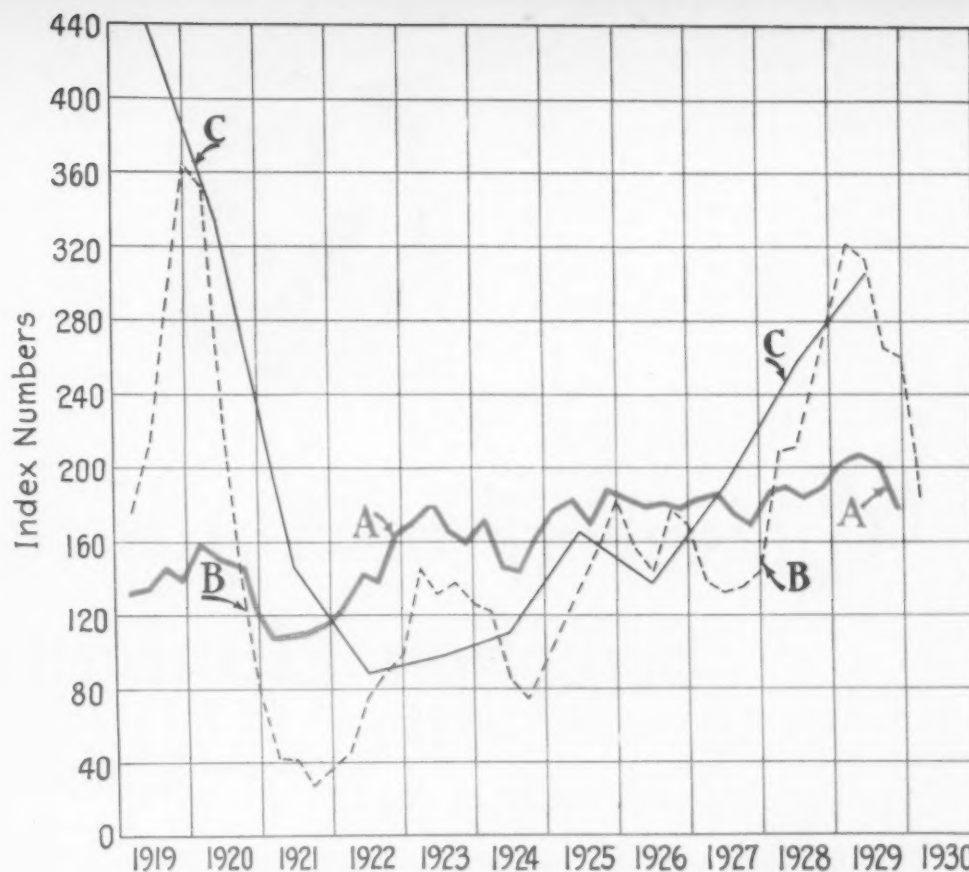
THERE is as yet no indication that the export demand for machine tools has felt or will feel a break that will correspond to the collapse experienced in domestic demand since 1929.

Markets of the world can absorb huge volumes of metal-working machinery if properly cultivated.

The author offers the relative stability of export demand as a reason for further cultivation of foreign trade to offset the seemingly inevitable swings in domestic demand for metal-working machinery.



THIS chart shows the general upward trend of metal-working machinery exports since 1922, when such exports reached their lowest point in the post-war decline. Line C is based on the export figures compiled by the Department of Commerce. Line A represents the fluctuations experienced by industry generally, based on the index of industrial production compiled by the Federal Reserve Board, while B represents the index of machine tool orders compiled by the National Machine Tool Builders' Association.



experience in both cases to substantially the same level (approximately 160).

How Wide Are the Swings?

Speaking of business generally, it is often stated that the difference between prosperity and depression is perhaps only a change of 10 per cent in gross volume. Statements have been published which indicate that production generally at present has not declined more than 15 per cent as compared with last year. Curve "A" appears to indicate swings that are much wider than that statement suggests, and yet the line does not suggest that even at the extreme the fluctuations vary scarcely 20 per cent above or below a line which would represent the trend of progress.

In contrast to this, the machine tool experience shows that their index rose as high as 363 at the end of 1919 and inside of 21 months had fallen as low as 28. So severe was this experience that new orders dropped to where they were less than 8 per cent of the peak. Obviously, both of these extremes impose a very severe tax upon management.

Recovery was slow and tedious, complicated by fluctuations. For reasons clearly recognized by those in the trade, new orders for such equipment did not catch up with the general curve for industrial production until the beginning of 1926, over five years, and did not cross that line until early in 1928, over seven years.

Since early 1928 there has again been a very active demand for machine tools; in fact, 1929 was probably the most prosperous year the machine tool industry has ever experienced. Demand reached its peak during the first quarter of that year and once

more we witness a precipitous decline since the end of the second quarter. The decline in general industrial production came just a little later, and while it has been so severe as to attract the earnest attention of all, the accompanying diagram emphasizes the greater severity with which the equipment industries feel these oscillations of the business pendulum.

This chart demonstrates clearly how manufacturers of equipment face management problems of extreme severity for, although this curve refers particularly to the experience in the machine tool industry and even though the methods employed in the preparation of this diagram are unsatisfactory from many points of view, the principles involved are vividly revealed, matters of the very greatest importance to all manufacturers of machinery, other factory equipment, in fact, "capital goods" generally.

Machinery Exports on Upward Trend

This opportunity has also been used to compare domestic demand for machine tools with exports of metal-working machinery. Again the comparison is imperfect and unfortunately cannot be corrected. The diagram is submitted for what it may be worth because it reveals interestingly the relation between export business and domestic business in this line. In the years prior to 1920 export demand was exceedingly heavy. Like the machine tool returns, this is plotted on the basis of an index number, the average for 1922, 1923, 1924 being 100. In 1919, the export peak was far above the domestic peak, and if the diagram had been continued to cover earlier years the peak would have been found even higher for, as contrasted with the 1919 index number of 440.8, the 1917 figure

(Concluded on page 674)



Guesswork in Abrasive-Wheel Selection Eliminated

By J. W. MARSHALL*

ANYONE responsible for the selection of the proper grinding wheel for a particular job will recall that, after extensive experimenting with wheels of many combinations of grain, grade, bond and kind of abrasive, and the final selection of a wheel that did the grinding most efficiently, his satisfaction was short-lived indeed. True, he found out what grain was required, what grade was needed, which kind of abrasive cut the best and what bond proved most efficient.

Then he placed his orders for wheels to these exact specifications. But, to his intense disappointment, the operating results fell far short of those attained with the experimental wheel. He could not tell why. The abrasive-wheel manufacturer could not tell why.

In an age of high-precision, high-production operations, of centerless grinding, of internal grinding, this admittedly was a serious situation. What was to be done? To find the answer one must look to fundamentals. Fundamentally, every grain of abrasive is a cutting tool. Hence, in a grinding wheel what we really have is myriads of small cutting tools held together by a bond.

Now, it is well known that one kind of abrasive is better suited for cutting steel, another for cast iron, etc. The kind of abrasive is therefore a variable we can control. We have learned also that hard wheels cut soft materials better, and vice versa. Hence we can control the grade of hardness of the wheel. Then, too, experimentation has taught us that for a fine finish or for hard, dense, brittle materials a fine grain is best; while for fast removal of stock and ductile materials a coarse grain is superior. Also, we have learned what kind of bonding material, vitrified, silicate, Bakelite, shellac, or rubber, gives the best results under different conditions.

*Springfield, Mass.

Altogether, four variables. And until now these appeared to be all the variables that entered into grinding-wheel selection.

But now the research department of the Norton Co., Worcester, tells us of a fifth variable, the amount of abrasive in relation to the other factors. Structure, it is called—controlled structure. If the structural characteristics of the abrasive wheel change, the other factors being equal, the grinding wheel behaves differently. What then does this mean? Openness of structure? Uniformity of structure? Density of structure?

No, we are assured it is none of these, for these terms are only relative, and does not the dictionary say that controlled structure is definite structure, measurable structure? Controlled structure, then, is the definite arrangement of the grains, the bonding material, and the pores or voids within the solid network formed by the grain and the bond. It is the control of the open spaces between the grains and the bonding materials.

If, in a grinding wheel, we measure by volume the percentage of abrasive, the percentage of bond and the percentage of pores present, then we have a composition or structure which is definite. We need no longer say that one wheel is denser than another, but instead can say that one wheel has 50 per cent of abrasive while another has only 40 per cent; or this wheel has 10 per cent of bond while that one has 15 per cent.

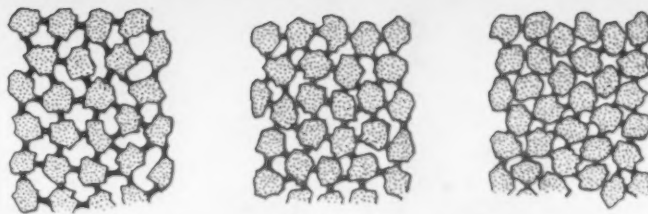
Looking at it from another point of view, if we measure the percentages of abrasive, bond and pores in a grinding wheel, then we know how the abrasive and bond are proportioned to each other and to the entire wheel. We have a measure of the average distance between individual grains; of the amount or thickness of the coating of bond holding each grain;

and we then have a picture of the structure, which could be drawn out to scale if desired.

The particular grade or hardness of any wheel is the result of the strength of the abrasive and bond used, plus the structure or manner in which the abrasive and bond have been arranged and proportioned. The grade letter is an index of the relative strength of the bonded piece. It has long been possible to have two wheels of the same degree of hardness but with different structures. With controlled structure, however, it becomes known exactly what this difference in structure is.

There can be only one combination of abrasive and bond for a given structure. A wheel which has 50 per cent of abrasive and 10 per cent of bond will have one particular grade or hardness. The same hardness may be obtained with a wheel of 40 per cent of abrasive and 16 per cent of bond, but the difference between two such wheels is readily apparent. The first one contains more abrasive and less bond than the second, which means that the abrasive grains are closer together, but held in with a smaller quantity of bond. There will be still other wheels of this same hardness, but they may have 45 per cent or 55 per cent of abrasive. But each such product will be identified by a characteristic amount of bond and abrasive, separate and distinct from all others.

The grinding action of a wheel depends primarily upon the strength of the abrasive and bond, plus the effect of grade and structure. It now becomes possible to vary more intelligently the properties of a particular wheel to obtain just the desired grinding action. A wheel of grade M hardness, with 50 per cent of abrasive, will grind differently from a wheel of the same hardness but containing only 40 per



Diagrammatic representation of abrasive-wheel structure. Bonds are shown by full black lines and the open spaces between the grains and the bond by blank spaces.

A system of wheel marking has been perfected by the manufacturer, to describe these characteristics or variables. With this system, the user is assured that, with a little study, the ordering of wheels will be far less complicated than in the past. The markings as described by the manufacturer are as follows:

1. Kind of abrasive.
2. Grain (size of abrasive).
3. Grade (strength of bond).
4. Structure (amount of abrasive).
5. Kind of bond.

Each of these five characteristics is represented by a symbol, and the relative positions of these five symbols determine their meanings in the designation of a wheel. A typical marking for a wheel is 3846-M5B; which is further analyzed by position in the following table:

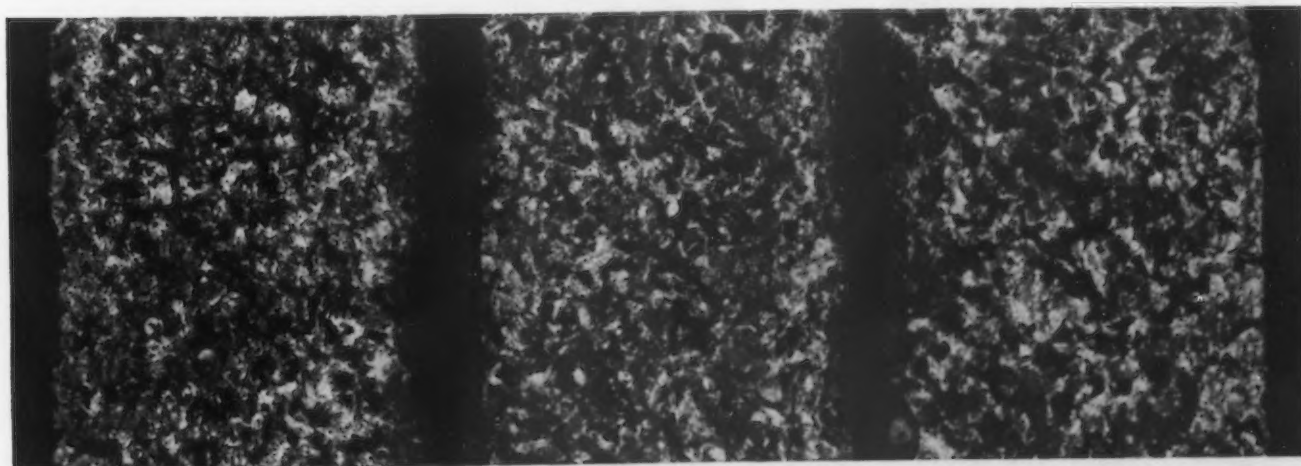
Position	1	2	3	4	5
Kind of abrasive.....	38				
Grain (size of abrasive).....		46			
Grade (strength of bond).....			M		
Structure (amount of abrasive)				5	
Kind of bond.....					B

Five distinct types of aluminum-oxide abrasives and one type of silicon-carbide abrasive are used in the manufacture of Norton grinding wheels. In the

marking of wheels these various abrasives (covered in the first symbol) are designated by a two-digit numeral as tabulated.

(Concluded on page 675)

Structure differences of three wheels, each magnified four diameters. Standard 8½ in. x ½ in., 20-grain, grade-M wheels. The denser wheel is of structure 3, the middle wheel of structure 5, while the more open, porous specimen is of structure 8.





All controls are centralized. Four-inch pipe crushed after welding is shown above.

Welder for Making Double Length Sections of Pipe

TWO standard lengths of pipe are welded into one double-length section approximately 48 ft. long on the resistance welder shown, which is being built by the Taylor-Winfield Corporation, Warren, Ohio. Such double-length sections reduce the amount of field welding necessary in laying gas and oil lines from the fields to distribution centers.

The machine is designed to permit convenient handling of the pipe and to operate rapidly. All controls are located conveniently at the operating position, which in being on top of the machine is out of the way of the movements of the pipe and permits the operator full vision of all operations. Clamping of the current-carrying jaws is accomplished by means of air cylinders and toggles. The jaws are of equalizing type and center both sections of the pipe to be welded regardless of size variations. The back-up shoes which hold the pipe against the heavy pressure required to make the final push for upsetting the weld are made of hardened tool steel and have suitable teeth to engage the pipe. The heavy rocker shafts that support the shoes are air-operated.

The transformer, the heart of the machine, is located close to the current-carrying jaws to assure high efficiency. The primary coils are entirely inclosed to protect them from flash and particles of steel which cause burn-outs. Because of the wide range of the machine (from 2 to 10-in. diameter pipe may be handled on the unit illustrated), a new multi-coil transformer with selective switch giving 12 different voltages is employed.

Hydraulic pressure for operating the push-up and the automatic flashing is supplied by a motor-driven, self-contained pump. The welding cycle, controlled by a dial, can be varied in speed from 4 to 40 sec. as required for the different sizes of

pipe, the adjustment being infinitely variable and not by steps. The flashing and push-up can be stopped or reversed at will and the complete cycle started again should the flashing or preheating for any reason be interrupted. The upsetting pressure

and the length of slide movement can be changed conveniently to suit different sizes and gages of pipe, and facilities for changing copper dies and the back-up shoes permit rapid change of set-up.

The machine is built in four sizes, 1½ to 6 in., 2 to 10 in., 6 to 16 in., and 14 to 24 in.

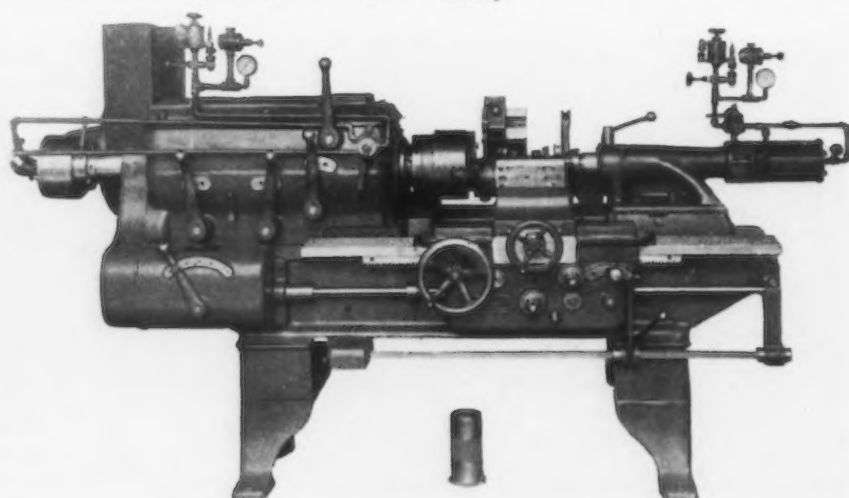
New Lathe Operates at High Speed

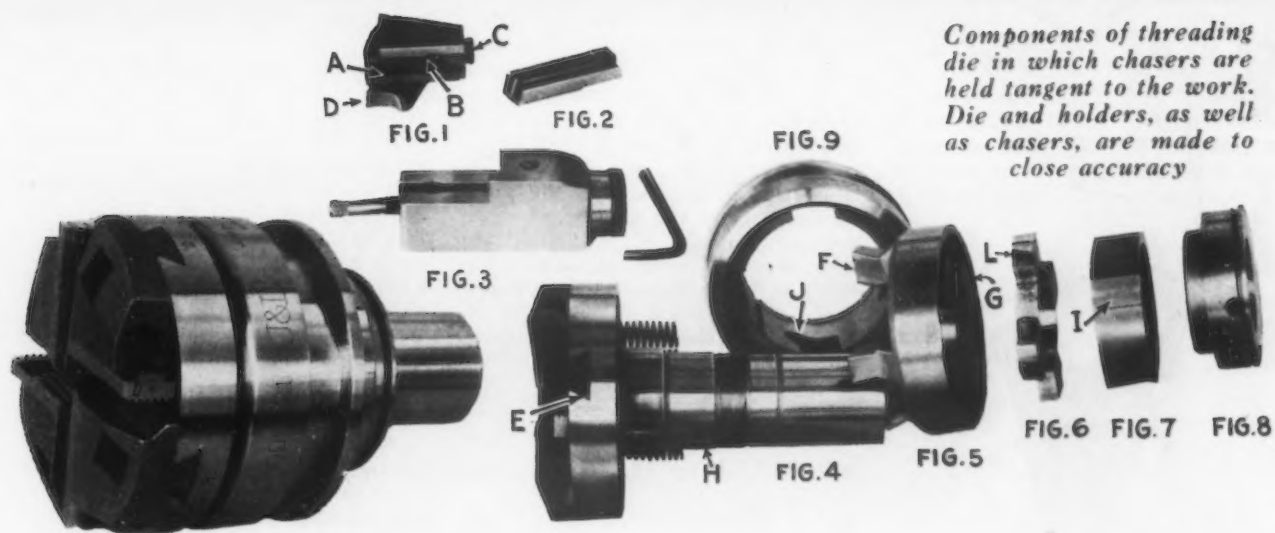
FOR turning cylinder sleeves at a high production rate the Monarch Machine Tool Co., Sidney, Ohio, recently furnished the special 20-in. model H lathe here pictured.

The machine incorporates a number of improvements. It is equipped with an eight-speed model L helical-gear Timkenized headstock which may be arranged for single pulley or direct motor drive, and with a special three-jaw Logansport air chuck and air cylinder for operating the tailstock spin-

dle. In addition, this new unit has an anti-friction bearing cone tailstock center and back arm facing attachment for facing the cylinder. Three tungsten-carbide turning tools are carried in the front tool rest and one in the rear facing rest.

Cylinder sleeves 4¾ in. in outside diameter and 9½ in. long are machined at the rate of 300 ft. per min., 240 r.p.m. of the spindle, 0.040-in. feed. The time required to turn each piece is 15 sec., against 2½ min. formerly.





J. & L. Die Has Chasers Tangent to the Work

IN the Tangent Die recently brought out by the Jones & Lamson Machine Co., Springfield, Vt., the chasers are held tangent to the work rather than radially as in common practice. This, it is pointed out, has the advantage that the dull and worn portion on the ends of the chasers may be removed completely at a sacrifice of only a fraction of the length of the chasers. Furthermore, inasmuch as the grinding is done on the chaser ends and not on the chamfer, machine adjustments for length of thread do not have to be made when chasers are changed. A worn-out set works just as close to a shoulder as a new set.

The die is positive in operation and opens easily under cut. The chasers, shown in Fig. 2, have the thread profile ground at the correct helix angle for a given diameter and pitch, and are, at the same time, so spaced relative to one another that they track properly. The dovetail on the back of the chaser is also ground. The ratchet teeth cut on the tongue of the dovetail engage mating teeth in the chaser-holder.

The chaser-holder, Fig. 1, has a ground dovetail, A, which receives the chaser, supporting it directly behind the cutting edge. The plug B fits in an accurately located and ground hole, and the teeth on the end of the plug engage teeth on the back of the chaser, preventing lateral movement. The plug is secured in position by the screw C, which also serves to operate the plug when the chaser is to be removed.

Chasers are sharpened by removing from the end an amount equal to the pitch of the teeth on the back. They are then measured in the gage shown in Fig. 3; a graduated micrometer screw tells exactly where the cutting edge will be when the chasers are in the die. The dovetail D, Fig. 1, on the chaser-holder is ground to fit the ground dovetail E in the body, Fig.

4; when assembled it will be seen that the chaser just clears the front face of the body and that overhang has been reduced to a minimum.

Radial movement of the chaser-holder is controlled by the cam ring, Fig. 5, the lugs F being ground concentric and true with face G. The cam ring is supported in four places by four lugs on the locking ring, Fig. 6, which engage it directly behind the lugs that control the chaser-holders. The locking ring is supported in turn

by the collar, Fig. 7, and the adjusting nut, Fig. 8. The collar, Fig. 7, is located on the body, Fig. 4, by the key H. The key I on the collar locates and prevents rotation of the operating sleeve, Fig. 9. Four cam surfaces, J, in the operating sleeve engage the four mating surfaces L on the locking ring, Fig. 6. In operation, the backward movement of the operating sleeve causes the locking ring to rotate slightly and release the cam ring, which, being forced back by the springs, opens the die. The forward movement of the operating sleeve closes the die.

Flexible Coupling of Light Weight

A NEW coupling, type E, has been placed on the market by the Ajax Flexible Coupling Co., Westfield, N. Y. It is of the pin and rubber bushing type, and is a modification of Ajax type A, which has been marketed for ten years.

Type E is in reality a special coupling of limited size, designed for purposes of economy on special applications, such as centrifugal pumps, small speed reducers, fans, motor-generator sets, and other jobs at motor speeds within its bore and load limitations.

It is made with aluminum alloy

flanges, hardened and ground alloy-steel drive studs and specially compounded rubber bushings firmly cemented to hard bronze bearings by a new Ajax process. Its weight is only 2 lb., due to the use of aluminum flanges. The outside diameter is 4 in. x 2 1/16 in. overall length. It is available for 7 1/2 hp., 1750 r.p.m., on steady loads, with 1 1/2-in. maximum bore or special keyways.

Installs X-Ray Plant for Routing Inspection

The St. John X-Ray Service Corporation, 505 Fifth Avenue, has installed an X-ray plant at the Barber-ton, Ohio, works of the Babcock & Wilcox Co. The photographic apparatus will be used primarily for routine inspection of welded seams in pressure vessels, heat exchangers and similar equipment.

Dr. Ancel St. John, president and technical director of the company which bears his name, says that the Babcock & Wilcox X-ray plant is certainly the first of its kind and in all probability, the most powerful as well.



Adjustable Internal Gage With Centering Support

TO the line of Krupp Mikrotast internal gages of fixed type and the Krupp Mikrotast saddle gages described in *THE IRON AGE* of March 29, 1928, has been added an adjustable type of internal gage, all of these being marketed in the United States by



the Coats Machine Tool Co., 110 West Fortieth Street, New York.

A feature of the adjustable gage is the centering support and interchangeable extension legs. The centering support comprises a yoke having two fixed corner supporting points and an extension leg the length of which may be varied by means of the interchangeable legs or points provided. This extension leg forms the apex of a triangle, the corner supporting points being the base. It is spring mounted and is adjustable to any desired diameter within range of the gage; when set it may be locked in the position. Midway between the corner supporting points, and directly opposite the contact point that is under spring pressure, is located the measuring contact point, which actuates the pointer on the indicating dial.

With this arrangement the gage assumes correct location in the diametral plane of the bore being measured because the spring pressure exerted on the corner supporting points is considerably greater than that of the measuring contact point. This combination of contact points will be recognized as different from that of the usual star gage, which has the gaging point arranged opposite two fixed points of abutment.

The measuring point of the larger internal gages with centering support is tipped with a special wear-resisting alloy; if desired the extension legs, measuring contact points and measuring plates of other sizes can be faced

with this alloy. A nonrusting steel mirror inclined at an angle of 45 deg. is available for attachment to the Mikrotast dial window to make the graduations visible from above.

Very accurate readings may be made. It is claimed that the gages make possible the control of every part of the bore of practically any diameter and depth, including blind holes to the bottom. Any deviation from the standard diameter is indicated by the Mikrotast pointer. Wide scale range and the ease of tak-

ing up wear, which reduce to a minimum the number of such gages necessary, are other advantages emphasized.

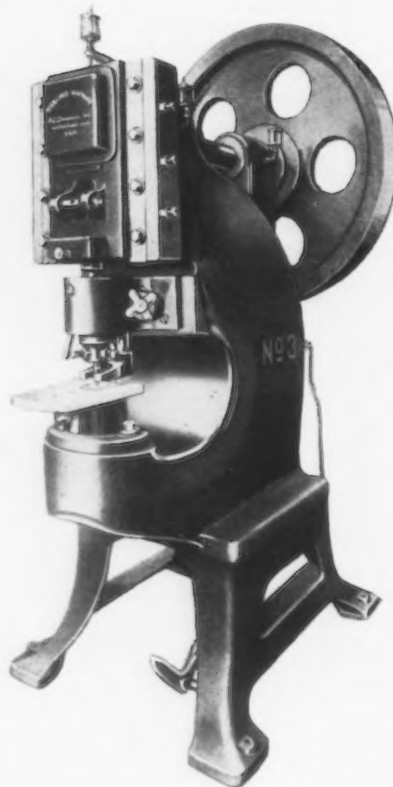
Six sizes, with a gaging head capacity of 0.787-1.024 in. to 7.874-14.173 in., are made. The number of extension points or fingers for each gage ranges from three to eight, according to capacity of the gage. Extension rods for deep holes are available in lengths from 2 to 11-13/16 in. The same gage with angular adapter for 2.165-in. and larger bores is furnished, as well as a gage with micrometer attachment between the adapter and gaging head, to facilitate setting.

Nibbling Machine Cuts Shapes from 3/4-In. Stock

FOR cutting shapes from sheet metal ranging from 3/8 to 3/4 in. in thickness, A. C. Campbell, Inc., Bridgeport, Conn., is offering a new nibbling machine, designated as the No. 3. The machine may be used not

assures close cutting to the line even by an inexperienced operator. In cutting duplicate pieces from the original piece the punch follows the template accurately.

This machine has a throat depth of 15 in. and has three strokes, 1, 13/16 and 1/2 in. The 3/8-in. punch employed may be set in the die quickly by turning the stroke adjustment collar, while the stripper plate may be positioned by releasing the locking lever and turning the handwheel. The net weight of the belt-driven machine is 9000 lb.

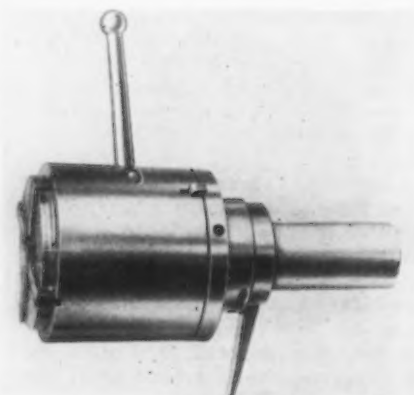


only for cutting original pieces, but also for production work where making of punches and dies would not be economical. Like the smaller nibbling machines, which range in capacities from 3/32 to 3/4 in., the No. 3 works on the circular punch and die principle and has a pilot that prevents the work from slipping and the punch from taking too large bites. Cutting is at the rate of approximately 20 linear in. per min.; the cut is clean, little finishing being necessary when an absolutely smooth edge is required. Circles may be cut accurately with the circle cutting attachment provided; for making original cuts the use of a straight-edge and the French curve

Self-Opening Die-Head for Short and for Fine Threads

EQUIPPED with a lever trip, the style KL self-opening die head recently added to the line of the Geometric Tool Co., New Haven, Conn., is particularly adapted to short threads or threads of fine pitch. All stresses from tripping are removed from the chasers and from the threads being cut, thus preventing torn threads.

The trip lever is placed so that it will contact with an adjustable stop, which may be easily rigged up for any machine. It is customary to put such a stop on the cross-slides, or in some cases on the bed or frame. Chasers interchange, tool size for tool size, with those used on other Geometric type K heads. Straight thread capacities range from 1/4-9/16 in. to 3-5 in., inclusive, in diameter, and from 2 3/4 to 6 1/4 in. in threading length.



Builds Testing Machine for Small Bevel Gears

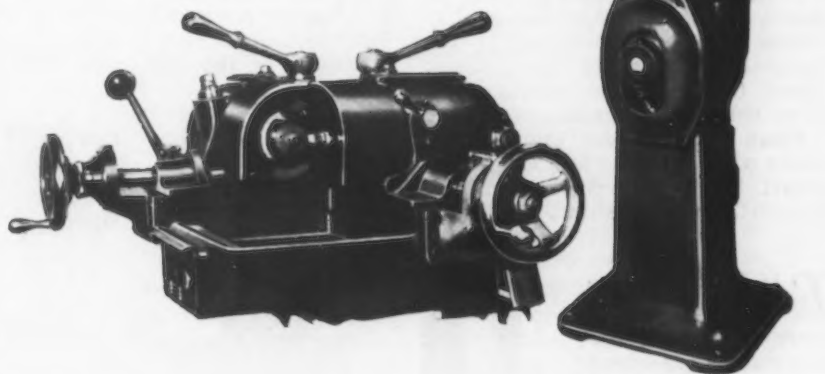
THE running qualities of straight and spiral bevel gears of the smaller sizes whose shafts intersect at 90 deg., may be tested rapidly on the 3-in. bevel gear testing machine made available recently by the Gleason Works, Rochester, N. Y.

The gears are tested by running them together in pairs or with a reference gear. They are tested to check the cutting machine for correct set-up; also after hardening for tooth bearing and noise, and to determine whether heat-treatment has made changes that must be compensated for during cutting. In case the gears are lapped, the testing machine may be used as a final check. On this machine the gears can be tested with or without load. The load can be applied manually by a brake operating on the driven spindle, or can be set for a fixed amount.

Extra care has been taken to make this a precision machine. The frame is heavy and is liberally ribbed to assure rigidity. Bearing ways on the frame are wide and narrow guides give close alinement. The spindles on which the gears to be tested are placed are carried on matched ball bearings. These bearings are mounted in pairs with sufficient initial load to eliminate all evidence of radial or axial deflection of the spindle under ordinary operating conditions. Labyrinth seals protect the bearings from dirt. Spindle noses are heat treated and the taper bores are ground with the spindles in place on their own bearings, assuring concentricity between spindle bearing and bore.

The drive or pinion spindle is power driven and is operated in either direc-

THE gears are tested either by running them together in pairs or with a reference gear and can be tested with or without load



tion by a push button control. The spindle is mounted in the pinion head, which is adjustable horizontally on the frame by means of a handwheel and lead screw graduated to 0.001 in.

The driven or gear spindle is mounted in an eccentric which permits a slight height adjustment either above or below center with reference to the axis of the drive spindle. With this adjustment the operator can obtain any desired location of bearing on the gear teeth of the gears being tested and also estimate the amount of change required in the settings of the cutting machine to produce this bearing in the correct mounting of the gears. It may also be used to compensate for wear in the ways of the machine. The eccentric can be locked in any desired position by lock bolts.

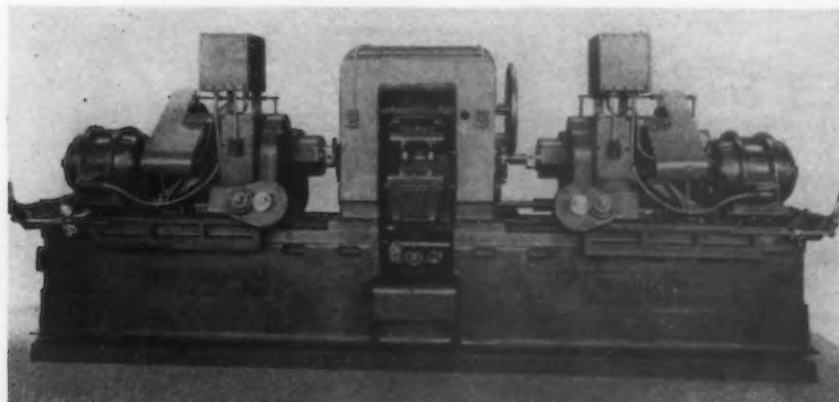
The gear head is adjustable horizontally on the frame at right angles to the pinion spindle by means of a handwheel and lead screw. Both heads are clamped to the frame at front and rear by separate clamps which operate with equal tension from a single lever.

All oil reaching the spindle bearings is previously filtered through oil cups; these cups are of improved design and have sight glasses. The guards shown in the close-up illustration are used when the gears are run together with an abrasive. The machine is arranged for belted motor drive, the $\frac{1}{2}$ -hp. 1500 or 1800-r.p.m. motor and reversing push-button control employed being built in. Floor space of 26 x 26 in. is occupied. The net weight of the machine is 550 lb.

Duplex Machine Bores and Taps Valve Bodies

LARGE duplex hydraulic-feed machines having special heads, single or multiple-spindle, and designed to permit tapping operations have been built recently by Baker Brothers, Inc., Toledo, Ohio. By means of heads and fixtures of suitable design the machine may be adapted for a wide range of operation.

The unit illustrated, equipped with a two-spindle head at each end and a three-station fixture, was designed for boring and tapping cast iron and steel valve bodies, from $1\frac{1}{4}$ to 4-in. tap. The main frame is a single casting upon which the duplex heads are mounted. These heads have multiple V-belt drive, and each has an inde-



pendent motor. To secure the desired tapping lead from the hydraulic feed mechanism, the heads are fed against a retarding cam, a separate cam being provided for each end. These cams are made in two pieces to facilitate change-over to different tapping leads, such changes being made in approximately 10 min. Separate gear feed pump with direct-connected motor is provided for each head. Provision is made for adjusting the spindles so that the tools may be set properly for the different sizes.

Operation is entirely automatic. Pressing a push button starts the main drive; the heads then feed through the work, the taps collapse, the heads back out and the motors stop automatically at the end of the cycle.

There is a separate oil reservoir in each end for the hydraulic feed pump. The fixture is equipped with an attachment that automatically brushes the chips to the rear and out of the machine. A 15-hp. motor is used for the main drive and a 3-hp. motor for each hydraulic pump. Ball bearings and force feed lubrication are used

throughout. In the valve boring and tapping machine adapters are furnished for the fixture plate for each

different size of fitting. The weight of the machine illustrated, complete with fixture, is approximately 20 tons.

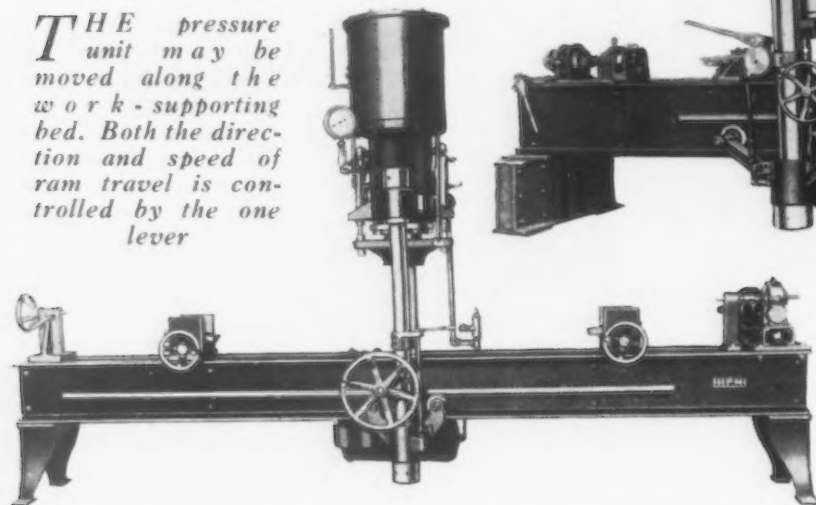
Shaft Straightening Press Has Sensitive Control

A NEW line of hydraulic presses for the production straightening of shafts, axles, bars, rods and similar shapes has been announced by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. Six sizes, ranging from 75 to 400 tons, are built.

These machines are intended for shafts which, in being long and heavy, cannot be moved conveniently back and forth under the ram. The pres-

sure unit, therefore, is arranged so that it can be moved along the work-supporting bed and pressure applied at any point desired.

THE pressure unit may be moved along the work-supporting bed. Both the direction and speed of ram travel is controlled by the one lever



sure unit, therefore, is arranged so that it can be moved along the work-supporting bed and pressure applied at any point desired.

Features emphasized are high production capacity and precision control. Unusually rapid operation is attributed to the H-P-M Fastraverse oil system employed for operating the press. The precision manual control governs both the direction and the speed of ram travel through a single conveniently located hand-lever. When this lever is in the mid position the press is at rest; when it is moved forward, the press ram moves forward; and when the lever is reversed, the press ram returns. Furthermore, the speed of the press ram is proportional to the distance that the operating lever is moved in either direction from the neutral position. Thus, with the lever at its extreme forward position, the press ram moves downward at maximum speed. Inasmuch as practically no effort is required to move the lever, control is very sensitive. In commenting upon the importance of accurate control in shaft straightening, the company points out that without close control too much dependence is placed upon the skill of the operator, with the possibility of bending the shaft too far and causing a new distortion.

The maximum working pressure is regulated automatically, and is adjustable over a wide range up to the

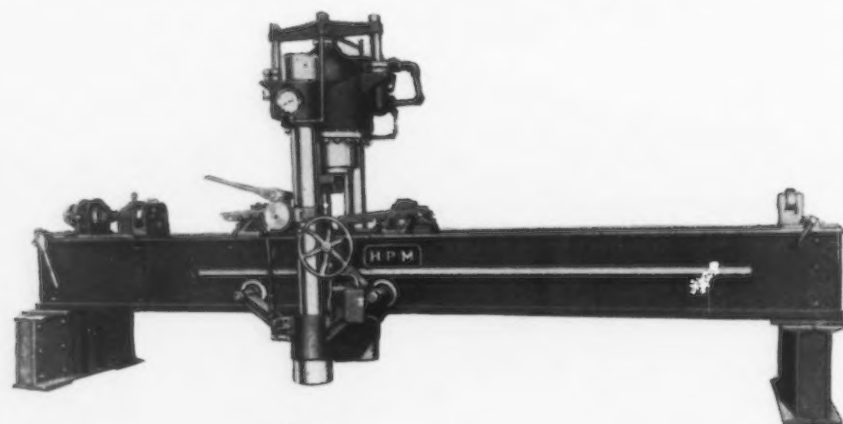
maximum. Of the six sizes of this press, the construction of the first four, having pressure capacities of 75, 100, 150 and 200 tons respectively, is as shown in the lower illustration,

Large Gas Engine Driven Welder for Field Service

GROWING use of electrodes of larger sizes prompted development of the large gas engine driven welder illustrated, which has been placed on the market by the Lincoln Electric Co., Cleveland. This machine, intended for field use of all kinds, including construction and repair work, is rated at 400 amp., with

current range to 500 amp. It is of variable-voltage single-operator type.

The working mechanism of all controls is inclosed in a ventilated steel cabinet with hand regulators and switches mounted on a panel which forms a side of the cabinet. The control panel contains rheostat, diverter switch, voltammeter and wing-nut terminals for cables, the unified control simplifying operation of the welder. The control cabinet, mounted directly over the generator, is acces-



sible. The commutator of the welding generator and the exciter are protected by covers.

A six-cylinder engine is employed. Automatic throttle control permits the engine to idle at about half speed when the arc is not in use; when the arc is struck the engine immediately resumes full speed. A time delay keeps the engine at full speed when the arc is momentarily broken and will not slow down for a predetermined time interval after breaking the arc. This permits the operator to change electrodes, etc., without affecting the speed. Savings in upkeep and gasoline are claimed.

The machine is provided with a metal cover and removable metal sides, the sides being interlocking so that the cover and sides can be locked with padlock and key. Wheels are optional; when furnished they are of 6 in. tread, and a fifth wheel is provided for short turning. The overall dimensions, exclusive of wheels, are 104 x 32 x 58 in. The weight of the machine is approximately 3500 lb.

AUTOMATIC throttle control permits the engine to idle at about half speed when the arc is not in use



Seasonal Expansion May Be Expected

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

FAVORABLE FACTORS

Progress in readjustment:

- 1.—Production curtailment.
- 2.—Economies.
- 3.—Retail price reductions.
- 4.—Some liquidation of collateral loans.

UNFAVORABLE FACTORS

Supplies still large and demand weak:

- 1.—Stocks of basic commodities large.
- 2.—Consumer purchasing power lower.
- 3.—Export trade declines.
- 4.—Commodity price recession continues.

PROGRESS in clearing up the business situation can be reported. The job is not yet completed, however.

The P-V line continues a virtually sidewise course, at a level considerably below the indicated normal. What does this mean? Recently the course of the P-V index (a ratio of commodity prices to the physical volume of trade) has been due to concurrent declines in the level of commodity prices and in an adjusted index of the physical volume of trade, or "primary distribution."

In spite of the rather steady downward trend in the volume of commodities coming to market, prices of commodities continue to decline. The conclusion warranted is that the demand for many commodities is weak in comparison with supplies; for the ratio of prices to quantity supplied has declined and is below normal, even allowing for a downward trend.

Prices Lower But Stocks Unliquidated

IN general the situation is this: Commodity supplies are being reduced, but the reduction thus far has been confined mostly to current production. Industrial production is now well below normal requirements. Even allowing for the possibility of a declining trend of business activity during the next few years, it is true. Therefore, the time seems near when excess supplies will be drawn upon.

But, thus far, stocks of basic commodities accumulated during past excesses remain virtually unliquidated. For example, there is the excess of sugar, silk, cotton, copper, zinc, lumber and gasoline. (We do not know the situation in iron and steel, but the production of these commodities has been in excess of indicated requirements.) So large are the visible supplies of many basic commodities that it will take considerable time to restore the equilibrium of the markets, even with so considerable a curtailment of current production as has taken place.

On the other hand, buyers' demand schedules are

low, increasing the weight of the supply load. (1) Domestic purchasing power of laborers and farmers is reduced. (2) Foreign demand is unfavorable, with exports affected by worldwide depression and by increased competition from European manufacturers. (3) The past abnormal purchases on the instalment plan are a factor. (4) Declining prices and business uncertainty retard demand. Results are seen in decreased retail trade, decreased exports and decreased buying by manufacturers and wholesalers.

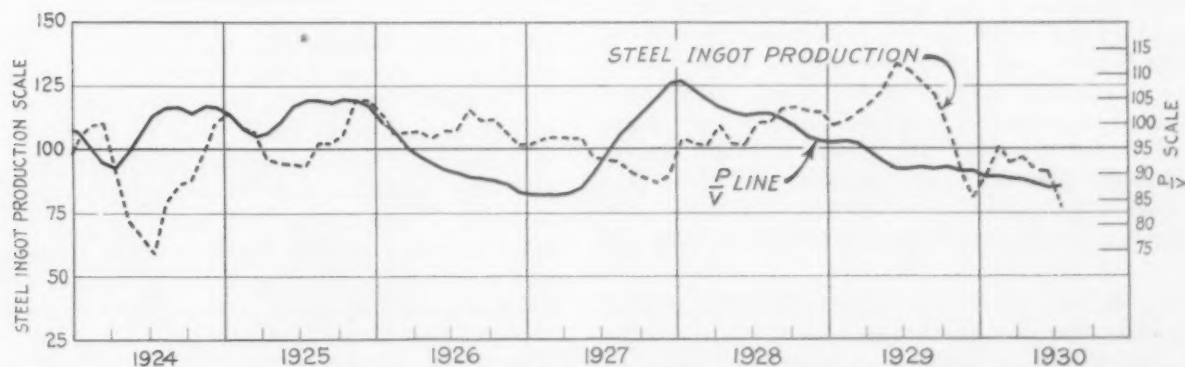
Equilibrium of the markets will, of course, be restored in time. The new equilibrium, however, will probably occur at a lower level of prices and costs than those which have prevailed in the last few years. We shall fail to understand the significance of the present period if we expect a return to 1929 conditions.

Over-expansion of credit in this and other countries is undergoing much needed corrections, and any recrudescence would bring great trouble. The domestic automobile market seems at last to have become definitely "saturated." Foreign competitive industries are on their feet again. It is up to us to make the necessary readjustments.

What We May Now Expect

Wholesale prices will become stabilized before long. Retail prices will fall in due proportion, and to levels which will allow normal purchases. Competition will reduce the expenses of management and labor, where required, so as to allow the efficient companies to do a normal business at a normal profit on the prudent investment. But to try to engineer a new boom under present conditions invites disaster.

Some seasonal expansion now? Yes. A general recovery in a few months? Yes. Fair profits for the most efficient concerns? Yes. A return to the stock prices, commodity prices and money wages of a year ago? No.



With a Sidewise Movement of the P-V Line (Ratio of Prices to Volume of Commodities) Past Experience Would Indicate That the Beginning of a Business Comeback Is Not Far Off

The Iron Age, September 4, 1930—637

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Finding New Uses for Steel

IN his presidential address at the May meeting of the American Iron and Steel Institute, as he dealt with the part good management had played and must continue to play in the steel industry, Mr. Schwab said:

New uses for steel are constantly being found and undoubtedly large unexplored fields for development lie ahead. Current expansion programs are likely to increase the plant capacity of the industry by about 7 per cent this year. Tonnage for this increased capacity should not be expected to come entirely from existing sources. An important part of it should be found by extending the use of steel into new fields.

In the months that have passed since these words were spoken it has become evident that the 1930 demand for steel will fall further short of full occupation of the country's steel mills than the leaders of the industry were willing to believe when they exchanged views on the outlook in May. Thus the situation of today emphasizes what has been said many times in these columns in the past two years on the necessity of finding new outlets for a steadily growing capacity. The percentage falling off in consumption this year for automobiles, building and railroad uses—three outlets which in recent years have taken about 55 per cent of finished steel tonnage—has been more than in the fields which have called for the remaining 45 per cent. It is in the adaptations of steel in the lighter rolled forms to new services that some of the best work of the industry will be done this year.

THE IRON AGE of Aug. 21 told of plans for building in Sangamon County, Illinois, the first test road of steel base construction which, according to the American Highway Educational Bureau, with proper surfacing material, will give a highway of exceptional strength and life, ideal for the wheels of traffic, and, as the result of long experiment in methods of construction, at a cost comparable with that of other pavements of the higher types. Highways may be a long time in ranking among major outlets for steel, but the steel road base is a good illustration of the new stimulus business conditions like the present give to sales effort that looks ahead, not to the last quarter or to next year but to 1935 and 1940.

And in the same week that has given publicity to the Illinois experiment with the steel roadway, the American Museum of Safety publishes in *Safety* an interesting story of the recent displacement of wood by steel tubular scaffolding in the erection of important buildings in New York City.

This movement, hastened by two costly fires originating in wood scaffolding, follows by two or three years the first use of steel in the construction of sidewalk protection canopies. In more than one case in which heavy material has fallen from derricks the steel canopy has proved a life saver.

In the months that will elapse before steel sales departments again find themselves put to it to placate buyers to whom deliveries are in arrears, there will be ample opportunity for a type of promotion work to which in the old days too many producers were strangers. Not much of it was done in the slack days of 1921, or in the setbacks of 1924 and 1927. But there are signs of a different attitude now. In part it may be due to the accumulating evidence that no such speedy recovery is to be expected as was seen in 1924 and 1927. Back of it, too, no doubt, is the belief of steel company executives that aeronautics, the new era in farming, and all the mechanical changes the new pace in our life is compelling will mean, in the next few years, a great increase in demand for steel in forms other than those which have so long been depended on for high-tonnage operations.

However we analyze it, the fact is that the steel industry, under the spur of adversity, is making headway today as never before in exploring new channels of consumption and in studying the problems of consumers with a view to furthering economical use of the products of the mills. Thus 1930 may justify to a degree not warranted before what Mr. Schwab, in the optimism of his May address, called the outstanding tradition of the industry—"alert responsiveness to changing conditions, resourcefulness, far sighted vision and courage to explore new ways in a spirit which finds change a stimulating challenge rather than an obstacle to progress."

ALMOST everyone who travels much by train or automobile has looked curiously for some mark which would identify the large manufacturing plants that are passed on the road. The New England Council has recognized that a good deal of advertising value is lost when manufacturers do not satisfy this natural curiosity of passers-by, and has urged its manufacturer members to place signs on their property that will assure ready identification. A recent survey of 300 manufacturing plants in that section of the country disclosed that 90 per cent now have one or more signs bearing the company name; that 84 per cent have at least one sign easily seen from the highway; that 50 per cent have a sign that can be read from passing railroad trains and that 54 per cent in some way an-

nounce to the passing world the product they manufacture. Eleven per cent of the companies canvassed have signs inviting travelers to visit the factory, while 8 per cent advertise in local newspapers that visitors are welcome. All of this is a fruitful way of building good will and interesting potential customers.

Measuring Ups and Downs in Trade

TO appraise the present in trade and guess at the future we must understand the past. It is easy to be impressed too strongly by the idea that ups and downs must balance, because in the retrospect we so often force a balance by drawing a trend line conforming with the statistics to date, while the future may alter the line.

We are, perhaps, on safer ground when we draw a trend line from long-past data, not using the most recent data. Thus, since it is well recognized that industrial conditions were better in the second half of 1928 than in the first half, we may take July 1, 1928, as a dividing date. It will be admitted that trade conditions were about equally good in the first half of 1923 and the first half of 1928, and with that five-year interval we obtain a fair measure of normal and natural annual growth. Then we can see how much excess there appeared to be afterward.

The Federal Reserve Board's index of industrial production, including manufacturing and mining, is based upon 1923-4-5 as 100. The indexes for the first six months of 1923 added up give 623, and for the first six months of 1928, 652; whereby one sees that there was an annual increase of just a shade under one point, and the trend line should be at 109 for July 1, 1928. As a matter of fact April, May and June of 1928 were given at 109. The excesses for the next 12 months, July, 1928, to June, 1929, inclusive, reached 15 per cent above what the previous trend line, continued, would make. The index for June, 1929, was 127 instead of 110, i.e., 109 plus a one-point increment for the elapsed year.

June, 1929, witnessed the height of the bulge and then activity went down rapidly. Even October was above our trend line, being at 117, but November was below, at 106. All these figures are quite in accord with the recollection of business men as to what was occurring, though perhaps the drop from June to October did not make a sufficiently full impression through vision being distorted by the failure of the stock market to reflect the decline.

It can hardly be denied that a 15 per cent bulge in the 12 months beginning July 1, 1928, was a very substantial bulge. As to its size, let us recall how stagnant some lines of trade became in the middle of 1924, steel in particular. Yet the industrial index for July, the lowest month of 1924, was 84, just 16 per cent under the 1923-4-5 average, and only 11 per cent under the 1924 average, which was 95. Then there was 1927, which had what seemed like a very dull ending, but November was 99 and December 100, the two months being only 6 per cent below the average for the whole year.

Plainly remembered history shows that it has taken a deviation of only a small percentage either way to make or break a situation, and the bulge with

which a seven-year period of activity ended was easily enough to make trouble. One cannot argue that it was natural, proper and all right unless he can explain why, if so, it did not come sooner.

Whether we are now engaged in making up for the bulge is a separate question. If that is the case it may be noted that the Board's index for last June was 101, whereas the old trend line would have called for 111. Thus trade appears to have been off 9 per cent, according to the old trend line, but it was off 20 per cent from the preceding June, when the bulge was at its height.

The Copyist of Machinery

"We have frequently expressed our views on the tendency of British firms to allow their competitors abroad to gain a lead in new developments, and should not now return to the subject had we not recently heard it suggested that this is sound policy. The argument was advanced by an eminent engineer on the grounds that the necessary experimental work is borne by others, and that when the commercial stage has been reached, we are able to step in and secure a good position in the market in virtue of our ability to improve on existing designs and of our skill in manufacture."

The above is a quotation from an editorial in *Engineering* (London) May 9. The typical American machinery manufacturer usually has adopted a policy exactly contrary to that described. This fact, perhaps, helps to explain how leadership in the industrial world has now passed to the United States. Progress in civilization, depending in large degree on progress in engineering, demands that everything possible be done to encourage research, invention and development.

Battling the lower costs of production abroad, American machinery manufacturers clearly need protection also against foreign copyists. On top of cheaper manufacturing costs these copyists would escape the costs of conception and investigation, and all of that series of operations described as "getting the kinks out of the design." Obviously they should be able to offer their products at prices which are beyond the competition of the machinery builders who carry the burdens of promotion.

Ways should promptly be discovered to meet the situation. What will prove to be most effective is the question. If units of the American machinery building industry have suggestions, or, better still, have had some successful experiences, the rest of the exporters would welcome word of them.

The Example of Massachusetts

MASSACHUSETTS has this year been celebrating the tercentenary of the bringing of its charter, although its settlement began about 10 years previously and by 1630 there were several communities in existence. The immigration which ran strongly from 1630 to 1639 brought to Massachusetts some of the most virile stock of England.

The newcomers were disappointed in the severity of the winter. They had to work long and hard. The breaking up of virgin soil with primitive tools, the

felling of trees, and the pulling of stumps and boulders were back-breaking tasks. However, the farms, the forests and the fisheries had it in them to supply all of the food, fiber and fuel that were needed for sustenance, clothing and heating. The forests also supplied the timber for habitations, while clay-beds furnished the material for brick, oyster shells for lime, and the skins of animals could be tanned to leather. The great deficiencies were cordage, soap, ammunition and tools and implements. They boldly essayed to make iron at Lynn, using bog ore, but the ore was scarce and poor.

They did not have any gold and silver for money and for currency they used musket balls, or more commonly wampum, or shell, which was adopted from the Indians and was legal tender until 1661. They had no banks nor bank accounts. Their increase in wealth could take physical expression only, e.g., in land and houses, cattle and other live stock, tools, clothing and furniture. In that way the inventories of yeomen dying after 20 years in the new country were often substantial.

They built ships out of their forests, as early as 1631, and, as fish was the only commodity of which they had a surplus, they instituted an export trade in it. Vessels with fish would go to France and Spain. With the proceeds wine and olive oil were bought and carried to England, where they were sold, so that the ships returned to Massachusetts with metal goods and the other things that the colonists were unable to provide for themselves; or such things that they could buy more easily than they could produce.

This is a sketchy outline of the pristine economy of a commonwealth that eventually became the paragon of American civilization and inspiration. It began with no capital worth mentioning, nor credit, nor currency (except a token currency). Progress was nat-

urally slow. Even so there was a steady forging ahead. The simple explanation is hard work.

The economic history of Massachusetts has teachings for us today. We wonder whether the great army of unemployed in Great Britain is of the same stuff as the few thousand Englishmen who emigrated in 1630-39. We wonder whether the economic rehabilitation of France, which has no unemployed, is associated with the French passion for industry and frugality. We wonder whether even Russia, with a dearth of capital, might not grow economically if it were free from communistic poison. In short, is not the whole world too much obsessed with its economic complexity and too forgetful of the basic purpose of its population to get a living, which implies work in all except those tropical isles where trees furnish food by dropping bananas and there is no urgency for clothing?

A SOMEWHAT unexpected state of affairs in connection with technical education in Great Britain has been revealed. It appears that there is a real shortage of engineers, metallurgists, and other technologists able and willing to take posts in the engineering industries. Sheffield University is reported unable to find enough graduates to fill the positions referred to them by local employers. It is suggested that depression as in the steel industry is leading students into the belief that it is useless to look for a career in that direction, and accordingly they are turning to branches of industry that seem to offer greater financial rewards. Similar swings in the popularity of educational courses have been experienced in the United States. Scarcity factors do not long elude discovery, but bring on their own correction.

Standard Analyses of Aluminum Alloys

THE Aluminum Research Institute began some sixty days ago an aggressive cooperative effort to standardize the methods of analyzing aluminum alloys.

In the past in many instances consumers of aluminum ingots have been confused and inconvenienced by receiving the results of analyses by commercial laboratories of aluminum ingot samples which did not closely check with the analyses reported by the smelters. Upon investigation, it was usually found that the methods of analyses used by the commercial laboratory and the smelter varied in important particulars, thus causing needless expense and delays to both the consumer and the smelter. In fairness to all commercial laboratories, it should be said that many of them are seldom called upon for an analysis of an aluminum alloy. Consequently, many of them do not intensively study methods of analyses and do not gain the experience necessary in acquiring the technique for making such analyses.

Recently, the members of the Aluminum Research Institute undertook a check against each other on an analysis of identical samples. A comparison of results indicated an unnecessarily wide variation in findings. As a result, it was unanimously voted to enlist

the cooperation of one of the leading commercial laboratories with the view to developing standard methods of analyzing secondary aluminum and its alloys.

On June 30 the chief chemists of the members of the Aluminum Research Institute met with the chief chemist of a highly regarded and internationally known commercial laboratory. Definite plans and procedure were scheduled for the accomplishment of the end in view. The standard practices that are currently used by the commercial laboratory and by members of the institute have been exchanged and are now being critically studied.

The interested chief chemists were to hold another meeting the latter part of August at which the critical comments of all were to be invited upon the various current methods in use within the industry and to a comparison of the results of the analyses of the standard sample that has been distributed. It is hoped and believed that the discussion which took place at this meeting will lead to the adoption of a standard practice for analyzing aluminum alloys, to which the entire aluminum industry will subscribe.

Steel Production Continues in Slow Upward Trend

▲ ▲ ▲
INGOT Output Now 55 Per
Cent—Sheet Mills Take Price
Stand—Pig Iron Production Off
4.3 Per Cent in August.
▼ ▼ ▼

PIG IRON production declined 4.3 per cent in August, sinking to the lowest daily rate since October, 1924. But this recession is regarded as water over the dam, in view of the current trend of iron and steel works operations and the growing resistance of producers to price pressure.

Steel ingot output, notwithstanding the rather general interruption of business during the Labor Day week-end, has registered the third consecutive advance in as many weeks, now averaging 55 per cent, compared with 54 per cent last week and 52 per cent three weeks ago. While the gains have been slight, they have been none the less recognizable and have encouraged leading independent sheet makers to make the first determined price stand in more than a year.

Quotations announced by these mills eliminate recent minimum figures and will apply particularly on September business. The advance represents an effort to halt a protracted decline, which depressed prices \$4 to \$12 a ton below the levels of the first half of 1929, and at the same time reflects a recognition of the growing interest in future requirements manifested by buyers in the last two weeks.

Doubtless this move and others reported to be in contemplation are calculated to help replace the depression psychosis with a spirit of confidence. While events will determine whether the time is yet ripe for such a change, it is the consensus of opinion that the trend of trade this month will largely determine the fortunes of the steel industry for the remainder of the year, and that even mild seasonal recovery will do much to put business on a firmer basis and lead the way to sustained improvement early in 1931.

Leading outlets for iron and steel disclose little change in tonnage consumed aside from the slight expansion recently noted, but no survey of the trade at a time like this can estimate the amount of business that is being held back by the ultra-conservatism that extends from manufacturing user and fabricator to ultimate consumer. Only a slight loosening of the purse strings all along the line, such as may be now in the making, would put many tons on producers' books. Another factor that may prove a deciding influence is the large unclassified, miscellaneous group of consumers, which last year took nearly one-fifth of all finished steel rolled.

Until a more definite trend is apparent reference must be made to such straws as are available. Pig iron shipments at Chicago in August showed a gain of 20 per cent over July, while certain Cleveland producers

report an increase of 25 per cent. Improvement in orders for both alloy steel bars and carbon bars points to moderate expansion in automobile production. The first purchase of sheets (1000 tons) for the new Chevrolet models has been made, and steel purchases for the first 20,000 of these cars are soon to be concluded. New inquiries for fabricated structural steel, at 71,000 tons, are the largest since the second week of June. Tin plate production has risen to 70 per cent of capacity, following the passing of the drought scare. Scrap markets have held their recent gains, notwithstanding ample stocks in the hands of large consumers.

Total pig iron production in August, estimated from telegraphic returns to THE IRON AGE, was 2,526,500 tons, compared with 2,639,537 tons in July. The daily average in August, 81,500 tons, underwent a decline of 3646 tons (4.3 per cent) from the July rate of 85,146 tons.

The action of independent sheet producers on prices follows the appearance of new recessions in the current week, as low as 3.50c., Pittsburgh, having been done on automobile body sheets and 2.35c. on black sheets. Under the new quotations, body sheets will be held at 3.60c. and black sheets at 2.45c., while light plates and blue annealed sheets, heretofore 1.90c. and 2.05c., will be 2c. and 2.15c., and galvanized sheets, recently as low as 3c., will be 3.10c.

An important change in extras on full-finished and automobile body sheets has also been adopted by leading makers. A deep drawing charge of 35c. a 100 lb. will replace two previous extras, one of 25c. for regular deep drawing and another of 50c. for extra deep drawing.

Fender stock, as a consequence of recent concessions, is now quotable at 3.60c. to 3.70c. a lb., Pittsburgh or Cleveland, a decline of \$2 a ton in the minimum going price.

The International Steel Cartel, according to a radio-gram from abroad, has abandoned control of export prices of semi-finished steel and beams. Export prices of all products controlled by the cartel are now free from restriction. Since outputs of member countries are now below their quotas, the syndicate's function of regulating production also has become inoperative.

All three of THE IRON AGE composite prices remain at last week's levels. Finished steel, at 2.142c. a lb., is \$5.12 a net ton lower than a year ago. Pig iron, at \$16.88 a gross ton, is \$1.37 below its level of 12 months ago. Heavy melting scrap, at \$13.67 a gross ton, is down \$3.16.

PITTSBURGH

Independent Sheet Mills Advance Prices— Ingot Output Is Slightly Higher

PITTSBURGH, Sept. 2.—Although rather general interruption of business over the Labor Day week-end makes it difficult to discern any change in the steel industry, it appears that recent tendencies toward improvement are still in evidence.

Of outstanding importance is an announcement by leading independent sheet makers that, effective today, quotations on the general line of sheet steel products will be advanced by the elimination of recent minimum figures. The prices will apply particularly to September business and, while it is likely that some sheet buyers were able to place orders last week at the low prices recently effective, mills will have an opportunity to establish the new asking figures on fourth quarter business.

The move shows the first disposition of flat-rolled steel makers to check a decline in prices which has continued for more than a year, and which has brought quotations from \$4 to \$12 a ton lower than they were in the first half of 1929. The advance also reflects recognition by the mills of increased interest in future requirements which has been evidenced by buyers in the last two weeks.

Steel makers in this district advance the opinion that the trend of activity this month will largely decide the fortunes of the steel industry for the remainder of the year. Even mild seasonal recovery will do much to establish business again on a sound basis and lead the way to sustained improvement early in 1931. Continuation of the dullness which prevailed in July and August would make future recovery far more difficult, and likewise lead to further price demoralization.

During the last week tin plate shipments continued large and brought about a definite increase in operations. Sheet mills continue to run at about 50 per cent, with slight increases scheduled for today. Little change has occurred in the heavy hot-rolled products. Talk of further extension to facilities for river movement of various commodities has improved sentiment among barge builders. Structural steel and reinforcing bar lettings in this district were light.

The leading interest has increased its open-hearth production slightly and furnaces have been added by two independents. The operating rate for the district is estimated at 55 per cent or better, after having dropped under that figure rather consistently during August.

The scrap market is again dull following three weeks of advances in

Effort to check price decline taken by independent sheet mills, which have announced prices \$1 to \$2 a ton above recent low levels.

* * *

Despite interruption of activity caused by Labor Day holidays, steel output in district is slightly higher.

* * *

Trend of business this month will determine fourth quarter situation.

* * *

Tin plate shipments large and operations of mills have been stepped up.

* * *

Scrap turns dull after three weeks of price advances, but no weakening tendency is noticeable.

prices, but no tendency toward decline is noticeable.

Pig Iron

Sellers of pig iron report the usual carload sales, with general inquiry for substantial tonnages lacking. Consumption of iron in the territory served by Pittsburgh and Valley furnaces is estimated at less than 50 per cent of normal, this figure holding for basic iron used by steel companies as well as for foundry and malleable grades. With only one strictly merchant stack in blast in the Pittsburgh and Valley districts, production is at a low point, but stocks are ample, particularly of basic iron on steel company yards. Prices remain nominally unchanged. Large buyers are not inclined to test the market with sizable inquiry, and small users are paying the figures quoted below with little question.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$18.00
Bessemer	18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.50
Low phos., copper free....	\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$18.50
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel

As a number of buyers of semi-finished steel are receiving billets, slabs and sheet bars on their second quar-

ter contracts, recent sales have not provided a test of the market. The \$31, Pittsburgh or Youngstown, quotation, which has been in effect for two or three months, is regarded as slightly out of line with finished steel prices by some buyers, but these mills are unwilling to contract for sufficient tonnage at this time to bring out concessions. Shipments during August have been lower than in any month this year and specifications have not increased materially in the last two weeks. Occasional spot sales of forging billets are being made at \$36, Pittsburgh, but shipments are light. Wire rods are holding at the same level as forging billets and specifications improved a little with some companies during the last two weeks.

Bars, Plates and Shapes

Consumer interest in future requirements of the heavy hot-rolled products has continued in the last week, but buyers indicate no haste in making commitments. With the Labor Day holiday past, mills are inclined to believe that orders will come in more freely. Bars are commanding more attention than plates and shapes, and new business, as well as specifications, has shown moderate improvement. Shipments to the automotive industry have picked up, but makers do not feel that this increase will show marked proportions. Miscellaneous consumers of bars have operated their plants at a low rate during the summer months and still seem to be waiting an upturn in general business conditions before departing from their hand-to-mouth buying policy. Reinforcing bars are still moving in good volume, although new business has declined seasonably. Plates are very dull, as shipbuilding activity in the East does not affect this market, nor do Pittsburgh mills benefit by heavy requirements of the Milwaukee pipe fabricator. Shipments to railroad carbuilders in this district are declining and barge yards, with one or two exceptions, are idle. Local structural steel fabricators are maintaining only a skeleton production schedule, but the two leading interests are fairly well engaged on work originating in the East. It is significant that the largest mill in the district, which is devoted entirely to the rolling of plates and shapes, is running at practical capacity, but this may represent in part a concentration of activity in order to lower general costs.

Prices have not changed materially, with plates and shapes quoted nominally 1.60c. to 1.65c., Pittsburgh. The higher figure applies to carload and mixed carload lots, while even 1.60c.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
No. 2 fdy., Philadelphia.....	\$19.76	\$19.76	\$19.76	\$21.26
No. 2, Valley furnace.....	18.00	18.00	18.00	18.50
No. 2 Southern, Cin'tl.....	15.69	15.69	16.19	17.19
No. 2, Birmingham.....	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago.....	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.....	18.75	18.75	18.75	19.75
Basic, Valley furnace.....	18.00	18.00	18.90	18.50
Valley Bessemer, del'd P'gh..	20.26	20.26	20.26	20.76
Malleable, Chicago.....	17.50	17.50	17.50	20.00
Malleable, Valley.....	18.50	18.50	18.50	19.00
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00

Rails, Billets, etc., Per Gross Ton:	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Rails, heavy at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh...	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00
Skelp, grvd. steel, P'gh, lb...	1.70	1.70	1.70	1.85

Finished Steel,	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.65	1.95
Bars, Chicago.....	1.75	1.75	1.75	2.05
Bars, Cleveland.....	1.70	1.70	1.75	1.95
Bars, New York.....	1.93	1.93	1.98	2.29
Tank plates, Pittsburgh.....	1.60	1.60	1.65	1.95
Tank plates, Chicago.....	1.75	1.75	1.75	2.05
Tank plates, New York.....	1.88	1.88	1.88	2.22½
Structural shapes, Pittsburgh..	1.60	1.60	1.65	1.95
Structural shapes, Chicago...	1.75	1.75	1.75	2.05
Structural shapes, New York...	1.80½	1.80½	1.85½	2.19½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh..	1.65	1.65	1.65	1.90
Cold-rolled strips, Pittsburgh.	2.35	2.35	2.35	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.40	2.40	2.45	2.85
Sheets, black, No. 24, Chicago	2.50	2.50	2.60	2.95
dist. mill.....	3.00	3.00	3.10	3.50
Sheets, galv., No. 24, P'gh...	3.10	3.15	3.20	3.60
Sheets, galv., No. 24, Chicago	2.05	2.05	2.15	2.35
dist. mill.....	2.25	2.25	2.25	2.45
Wire nails, Pittsburgh.....	2.00	2.00	2.05	2.55
Wire nails, Chicago dist. mill.	2.10	2.10	2.10	2.60
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.40
Plain wire, Chicago dist. mill.	2.35	2.35	2.35	2.45
Barbed wire, galv., P'gh.....	2.70	2.80	2.80	3.20
Barbed wire, galv., Chicago	2.85	2.85	2.85	3.30
dist. mill.....	\$5.25	\$5.25	\$5.25	\$5.35
Tin plate, 100 lb. box, P'gh..				

Old Material, Per Gross Ton:	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Heavy melting steel, P'gh....	\$15.50	\$15.50	\$14.75	\$18.75
Heavy melting steel, Phila...	13.00	13.00	12.50	16.50
Heavy melting steel, Ch'go...	12.50	12.50	12.00	16.25
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	15.00	15.00	14.50	16.50
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	16.50
No. 1 cast, Ch'go (net ton)...	12.00	12.00	12.00	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	18.00
No. 1 RR. wrot., Ch'go (net).	10.00	10.00	10.00	14.00

Coke, Connellsville, Per Net Ton at Oven:	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.50	\$2.65
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals,	Sept. 2, 1930	Aug. 26, 1930	Aug. 5, 1930	Sept. 3, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	11.12½	11.12½	11.12½	18.12½
Electrolytic copper, refinery...	10.50	10.50	10.75	17.75
Tin (Stralts), New York.....	29.75	29.50	30.25	45.50
Zinc, East St. Louis.....	4.35	4.30	4.50	6.80
Zinc, New York.....	4.70	4.65	4.85	7.15
Lead, St. Louis.....	5.35	5.35	5.35	6.65
Lead, New York.....	5.50	5.50	5.50	6.75
Antimony (Asiatic), N. Y....	7.75	7.75	8.25	8.62½

may be shaded on large and desirable tonnages. Recent weakness in bars is not so pronounced in the immediate Pittsburgh territory as in outside districts in which material is sold on a Pittsburgh base. Mills continue to quote 1.65c. on bars, and this figure represents the market on carload lots or slightly heavier tonnages. Small contract users are also paying this price. On heavier tonnages, 1.60c. is done rather regularly and must be shown in the price range.

Tubular Goods

August was a rather bad month for pipe makers, as few line pipe orders were placed and business in general fell off. Makers of standard pipe expect a seasonal improvement in their business this month, but they also expect the improvement to be affected by generally depressed conditions prevailing in the industry. In the oil country, demand for drilling pipe is limited and stocks in the hands of distributors are sufficiently large to prevent any sudden demand to develop. Boiler tubes continue satisfactorily active, while mechanical tubing is very dull in spite of somewhat heavier specifications from the automobile industry in the last few weeks. Mills making large diameter line pipe are running at a good rate and a few of

the seamless units in the Pittsburgh and Youngstown district are well occupied. Otherwise pipe mills are running at little above the average for finished steel products as a whole.

Wire Products

Specifications for manufacturers' wire are holding at recent levels, with further improvement expected this month. Merchant wire products are very dull. Shipments to the South and Southwest are light. The usual spring dating terms on wire fence, which became effective in the South on Aug. 18, were placed in effect in the North on Sept. 2. They reveal no important changes from previous years. Manufacturers' wire prices are holding at 2.30c., Pittsburgh, but nails are weak. In the immediate Pittsburgh district jobbers are paying \$2.05 per 100-lb. keg, although this figure has been shaded \$1 and \$2 a ton in other territories.

Warehouse Business

Sales of iron and steel products out of warehouse increased slightly in volume in the last two weeks of the month, but did not equal July sales. Quotations on black, galvanized and blue annealed sheets have been reduced, but the heavy hot-rolled prod-

ucts, cold-finished steel bars and hoops and bands are unchanged. Nails have come down 10c. a keg and are now quoted at \$2.35. Bolts, nuts and rivets are holding well at recent discounts.

Strip Steel

Operations this week will show a moderate improvement in some mills, but the average for the industry will not be materially changed. No general increase in releases from the automobile industry is reported, and possible improvement this month will be checked by a cessation of activity in the plants of one of the largest motor car makers from Sept. 15 to Oct. 1. The company will be down for the usual inventory taking as well as preparations for model changes. The new manufacturer at Butler, Pa., is gradually increasing its strip requirements and promises to be a fairly important factor in the local market. Strip prices have not changed materially, although shading of hot-rolled quotations in the Detroit market continues. Concessions have been confined chiefly to large buyers and also to material wider than 6 in., on which the general market is quotable at 1.65c., Pittsburgh. On the narrower widths, the 1.75c., Pittsburgh, price is holding. Prices on cold-rolled strip range from 2.35c. to 2.45c., Pitts-

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap			
Sept. 2, 1930	2.142c. a Lb.	\$16.88 a Gross Ton	\$13.67 a Gross Ton			
One week ago	2.142c.	16.88	13.67			
One month ago	2.171c.	16.96	13.08			
One year ago	2.398c.	18.25	16.83			
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.			
	High	Low	High	Low		
1930.....	2.362c., Jan. 7	2.142c., Aug. 26	\$18.21, Jan. 7	\$16.88, Aug. 12	\$15.00, Feb. 18	\$13.08, July 1
1929.....	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928.....	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927.....	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926.....	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925.....	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

burgh, with the higher figure definitely applied to small tonnages.

Cold-Finished Steel Bars

Slightly heavier releases from automotive plants brought improvement in tonnage to a few makers at the end of the month, but the industry as a whole showed no marked improvement. Sales in the West are very light and uncertainty in the agricultural implement industry is holding up specifications. The official price remains unchanged at 2.10c., Pittsburgh, and this seems to be holding on small orders which constitute the bulk of present business. Ground shafting remains at 2.45c. to 3.40c., Pittsburgh, according to size.

Sheets

Several large independent sheet makers have announced what amounts to an advance in the asking prices of sheet steel products for the remainder of this quarter. Although prices named are really the same as those which mills have sought for several weeks, they actually amount to advances of \$1 and \$2 a ton over figures which have recently been applicable to most of the tonnage placed. It is generally believed that the leading interest will take similar action regarding prices.

Under the new plan, light plates and blue annealed sheets made by jobbing mills are quoted at 2c. and 2.15c., Pittsburgh, respectively, as compared with recent quotations of 1.90c. and 2.05c., which had become rather general. Continuous mill light plates and blue annealed sheets are quoted at 1.80c. and 1.95c., Pittsburgh, respectively, while black sheets are now quoted at 2.45c., Pittsburgh, as compared with 2.40c. and occasionally lower, done recently. On galvanized material, the 3.10c., Pittsburgh, price is reaffirmed, with a \$2 differential only for very large jobbers. On auto body sheets, 3.60c., Pittsburgh, will be applied.

An important change in extras has also been adopted by leading makers which establishes the charge for deep drawing at 35c. per 100 lb. Previously an extra of 25c. had been asked for regular deep drawing and 50c. for extra deep drawing. The charges have constantly been subjected to considerable misunderstanding.

Considerable importance is attached

to the new price stand of the mills, as it is the first constructive move in the matter of quotations for nearly a year. While it is assumed that some mills have taken business in the last week at the old levels, an effort may be made to secure still higher prices in the fourth quarter. That such a plan is contemplated is shown by the fact that mills generally are unwilling to contract for the rest of the year at this time.

Tin Plate

Although shipments have declined from the peak of the previous week, tin plate specifications continue fairly good and mill operations have been stepped up by the independents as well as by the leading interest. The industry is now operating at about 70 per cent of capacity.

Coal and Coke

Spot sales of furnace coke are being made at \$2.60, Connellsville, and some sellers are willing to take long-term contracts at that figure. Occasional cars are going at \$2.65, and prices under \$2.60 have not entirely

disappeared. Foundry coke is being sold at a wide range of prices, but the premium brands are holding at \$4.85, ovens. The coal market is listless, with production low and prices weak even at present quotable levels.

Old Material

Following the comparatively heavy buying of the last two or three weeks, the scrap market has again lapsed into inactivity, with little change in price. Dealers are paying \$15.25 to \$15.50 to cover recent orders for No. 1 heavy melting steel, and occasionally cars for shipment to other points can be bought for less. Hydraulic compressed sheets are still strong in the Michigan area, but dealers are offering lower figures for local output and the market remains quotable at \$15 to \$15.50. Specialties are strong, particularly the low phosphorus grades, while blast furnace material is dull at recent levels.

The closing of the Pennsylvania Railroad list on Sept. 3 is being watched with considerable interest, as some rather high bids are reported to have been made by both mills and dealers. The Baltimore & Ohio list, which closes on Sept. 8 contains approximately 9000 tons of scrap.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel...	\$15.25 to \$15.75
No. 2 heavy melting steel...	12.50 to 13.00
Scrap rails	15.00 to 15.50
Compressed sheet steel...	15.00 to 15.50
Bundled sheets, sides and ends	13.00 to 14.00
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	15.50 to 16.00
Heavy breakable cast.....	11.50 to 12.00
No. 2 railroad wrought.....	15.25 to 15.75
Hvy. steel axle turnings.....	12.50 to 13.00
Machine shop turnings.....	8.00 to 8.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.50 to 18.00
Railr. coil and leaf springs	17.50 to 18.00
Roller steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 21.00
Low phos. mill plates.....	17.00 to 17.50
Low phos. light grades.....	17.00 to 17.50
Low phos. sheet bar crops	18.00 to 18.50
Heavy steel axle turnings..	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings.....	17.00 to 17.50
Heavy steel axle turnings..	12.50 to 13.00
Blast Furnace Grades:	
Short shoveling steel turnings	8.50 to 9.00
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings.....	8.50 to 9.00
Rolling Mill Grades:	
Steel car axles.....	21.50 to 22.50
Cupola Grades:	
No. 1 cast.....	13.00 to 14.00
Rails 3 ft. and under.....	16.50 to 17.00

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes...	2.75c.
Reinforcing steel bars.....	2.75c.
Cold finished and screw stock—	
Rounds and hexagons.....	3.35c.
Squares and flats.....	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates.....	2.50c.
Blue annealed sheets (No. 13).....	2.65c.
Galv. corrug. sheets (No. 28), per square	\$4.25
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb. \$3 30	
Wire, black, soft ann'd, base per 100 lb.....	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.....	3.20 to 3.30
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

CHICAGO

Steel Prices Show Further Weakness as Business Outlook Improves

CHICAGO, Sept. 2.—Although the steel market outlook is somewhat better in point of prospective tonnage, the price situation presents a less favorable picture. Plates, shapes and bars have been sold at as low as 1.70c. a lb., Chicago, and sheet prices are weak all along the line.

Specifications for finished steel in the past week have been on a par with those of the weeks immediately preceding, which can be taken as a satisfactory situation, considering that a week-end holiday usually tends to check activity in the market. New sales are also comparable with those of recent weeks and, as a result, backlogs are holding their own.

The brief shutdown at the holiday found ingot production at 57 per cent of capacity, with the prospect of a slight gain as the month gets well under way.

The local scrap iron and steel market is in a strategic position except for the fact that supplies in the hands of some users are large in view of the low rate of consumption. Incoming supplies are limited in most grades and sales to consumers reflect a steadier price structure.

Structural fabricators in this district continue to complain of lack of tonnage to operate shops on a profitable basis. They are confronted with two obstacles, the one being a slow market and the other keen competition which continually affects the fabricated steel price structure. Shops that make large storage tanks are rapidly expanding their books, and prospects for additional tonnages are excellent.

Pig Iron

New purchases continue to be made, though there is not yet under way a concerted buying movement for the final quarter. At the same time inquiries are quietly piling up and it is not unlikely that the next two weeks will find substantial tonnages added to producers' books. August shipments were somewhat of a surprise, having shown a gain of close to 20 per cent over the figure for July. Sentiment among foundrymen is slowly improving.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. char'cl, sil. 1.50	27.04
S'th'n No. 2 fdy., sil. 1.75 to 2.25	\$18.01 to 18.51
Low phos., sil. 1 to 2, cop-per free	29.50
Silvery, sil. 8 per cent.	27.29
Bess. ferro-silicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Steel business has held up fairly well over the holiday period, and outlook for gains this month is favorable.

* * *

Prices on plates, shapes and bars show weakness, with some sales at 1.70c. a lb. Sheets also weak.

* * *

Ingot output in Chicago district at 57 per cent of capacity.

* * *

August pig iron shipments gained 20 per cent over those of July.

* * *

Scrap market has undertone of strength, but large consumers are well stocked.

Ferroalloys

Specifications for these commodities in August showed some improvement over the volume in July. However, there is much room for improvement. New purchases are few in number and are for limited amounts.

Coke

Shipments of by-product foundry coke show moderate improvement. The price is steady at \$8 a ton, f.o.b. local ovens.

Bolts, Nuts and Rivets

Specifications have been unusually light in the past week and producers already stocked are meeting the situation by curtailment of production, which now stands in the range of 45 to 50 per cent of capacity. Fourth quarter contracts are being offered to users at current quotations.

Plates

Release orders for tank plates and plate mill products which are designated as skelp for electrically welded pipe have resulted in new all-time records in shipments from Chicago mills. Orders of this kind still bulk large, and it is assured that in September and October, and even November, shipments will be on a large scale. It is reported here that pipe makers east of Chicago have books that are well filled to the end of the year and that orders taken now are for deferred shipments.

Although orders for oil storage tank steel are light this week, inquiries have been expanded by 5000 tons, bringing the total tonnage on the pending list to something over 15,000 tons. Favorable reports continue to be received from tank fabricators, who in general are in a bet-

ter position with regard to orders than they have been at any time so far this year. Many of the orders at hand are for prompt shipment and one large tank shop has put on a night crew, the first that has been necessary since late in 1929.

The railroad equipment market remains quiet. The Mather Stock Car Co. has signified its intention to build 200 stock cars in its own shops which are tributary to Chicago mills.

The price situation as to plates is somewhat mixed. The 1.75c. a lb., Chicago, price is still the prevailing quotation on the bulk of tonnage that is moving to miscellaneous users. However, on several occasions in the last week or two 1.70c. has been named for attractive tonnages that are well adapted to present rolling schedules. Although shipments for pipe and tank manufacture remain heavy, local producers are reserving space on rolling schedules to meet immediate demands of smaller customers. For this reason most common sizes of universal and sheared plates can be delivered in one week to 10 days.

Cold-Rolled Strips

Prices are moderately steady at 2.63c. to 2.73c. a lb., delivered Chicago. Orders remain light and operations show no gain over the average in recent weeks.

Bars

An interesting phase of the bar market is the fact that several automobile parts makers have entered specifications. This situation is not at all general, but it is taken by some as an indication that the movement will spread as September advances. The urge to complete present road schedules before winter and also the impulse given to construction by governmental aid programs is proving an advantage to road machinery builders, who are increasing production and who have excellent prospects for further growth of order books. Specifications entered at mills by this industry are the largest in many weeks.

Agricultural implement manufacturers are, for the most part, marking time except where foreign orders make necessary additional steel specifications. The net result of mild steel bar orders during the week is that mill order books have grown slightly and the outlook in general is more favorable than it has been for some time. Occasional concessions of \$1 a ton are noted, although the general price in this district is 1.75c. a lb., Chicago.

The iron bar market remains sluggish in the absence of business from railroads and car shops. A slight improvement is noted in the demand for

alloy steel bars. Part of this comes from agricultural implement manufacturers who are working on foreign orders. Quotations on rail steel bars are holding at 1.65c. a lb., Chicago Heights mills. New orders are steady and do not show tendency to grow above the volume which holds mill production in the range of 50 to 60 per cent of capacity. Stocks at mills are unusually heavy, this being particularly true of fence post stock, which was piled in anticipation of a seasonal demand that has not materialized in the volume expected.

Wire Products

Western producers are opening books for the fourth quarter in a market where variable conditions are governing the price structure. Bright hard wire to the manufacturing trade is well established at 2.35c. a lb., Chicago. Common prices for wire nails range \$2.10 to \$2.15 a keg, Chicago, although quotations at \$2.05 a keg have made their appearance in outlying districts. Production still remains on a moderate basis for this time of the year, although some encouragement is offered by the fact that shipments in August showed a slight gain over the volume for July. This gain, however, was nowhere near in like proportion to that which is normally experienced by the wire trade at this time of the year. Demand by the manufacturing trade remains steady but small. Jobbers are carrying small stocks and are extremely cautious when it comes to ordering new supplies. The dealer trade is spotty, with the most favorable showing being made in the Southwest.

Reinforcing Steel

Inquiries are holding well in numbers, but the aggregate tonnage is well under that of a week ago. General contract bids have been opened on 600 tons of reinforcing bars for bridges in Cook County, Ill. It may be a week or 10 days before the bars are purchased. Small and scattered lots of highway reinforcing steel are being placed, and there still is tonnage of this kind to be bought. In general, quotations on small lots of rail and billet bars and on medium-sized tonnages of billet bars are steady. Variation remains on attractive tonnages of the rail steel commodity.

Structural Material

Structural awards, at about 15,000 tons, again make an impressive showing. However, as has been the case in many weeks during the summer months, the support to the market has come from surrounding territory rather than from the immediate vicinity of Chicago. A contract has been awarded for 5000 tons for a bank at Kansas City, Mo., and a subway for a terminal at St. Louis has added 6600 tons to mill books. Sept. 10 has been set by the Illinois Highway Department as the date on which bids will be opened on 1500 tons of steel for State highway bridges. The State of Montana is also inviting bids on a

bridge program. Fabricators, who several weeks ago found small awards somewhat more encouraging, have been disappointed that this class of business has not held up. Competition remains unusually severe and there is an increasing tendency for large shops to seek small tonnages which they usually disdain. Fabricators continue to exert pressure against mills for lower prices for structural material. In some few instances they have broken through the 1.75c. a lb., Chicago, price and have obtained concessions of \$1 a ton.

Cold-Finished Bars

Books have been opened for the fourth quarter at 2.10c. a lb., base Chicago. Order books are light and there is little or no disposition now on the part of buyers to make commitments for the remainder of the year.

Rails and Track Supplies

Railroads continue to enter scattered specifications against contracts that were put on mill books late in 1929. This year is characterized by slow shipments against old contracts. In fact, a smaller portion of contracts is now taken out than is usually the case by the end of June. One railroad, which had ordered its rails out early in the year and had many of them distributed along its right of way, has finally given orders to put the rails in the track. New purchases and inquiries of note are absent from the market this week. Operations at Chicago rail mills remain at the average of the past 30 days and this rate no doubt will hold during September for the reason that specifications are still coming in against old contracts.

Of special interest this week is the fact that many coal operators have resumed production, and the demand for light rails, though spotty, is con-

siderably better than it has been for several months. Orders for two or three carloads are now rather common, whereas an inquiry for a single carload created great interest within recent weeks.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe

This market is without feature except for the fact that hot and dry weather has convinced many municipalities that their water systems are inadequate. Many of them are now busily engaged in planning extensions and improvements which will call for round tonnages of cast iron pipe before many months have passed.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44 to \$46; 4-in., \$47 to \$49; Class A and gas pipe, \$3 extra.

Sheets

New orders are scarce and local hot mill production remains at 50 per cent of capacity. In the face of prices being more or less unsettled, books are being thrown open for the fourth quarter. Consumer interest in future requirements is practically non-existent.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.55c. to 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'l'd, 2.15c. *Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.*

Old Material

Tendencies in the Chicago scrap iron and steel market are somewhat mixed, although technically the market is in a strong position. A sale of 10,000 tons of heavy melting steel, noted last week, appeared to some sellers as a signal for all prices to advance. This, however, did not prove to be the case, for the reason that there is very little demand for many of the miscellaneous grades. It must not be overlooked that brokers urged buyers to take scrap at low prices against the possibility of a rising market. Brokers met with moderate success. It is a well-known fact that steel mills in general have accumulated large tonnages and therefore it seems probable that the local scrap market may not be as true an indicator of a change in general business as it has been in some years in the past.

Users of heavy melting steel are resisting the price advance and this week have turned down offers of \$12.50 a gross ton, delivered. They are still restricting incoming shipments and it is significant that distress tonnage is not a factor in this market. The impression is gaining ground, both among sellers and buyers, that scrap is not plentiful and that anything like a quickening in demand would find short supplies of many grades. Yard operators are sensing this situation

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons.....	2.85c.
5 tons to 30 tons.....	2.45c.
30 tons to 200 tons.....	2.00c.
200 tons and over.....	1.85c.
Rail steel reinforcement—	
Less than 5 tons.....	2.50c.
5 tons to 30 tons.....	2.10c.
30 tons and over.....	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.35c.
Flats and squares.....	3.85c.
Bands (¾ in. in Nos. 10 and 12 gages).....	3.10c.
Hoops (No. 14 gage and lighter).....	3.65c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.60c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes (¾ in. and larger).....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts.....	60 and 10
Carriage bolts.....	60 and 10
Coach or lag screws.....	60 and 10
Hot-pressed nuts, sq., tap. or blank, 60 and 10	
Hot-pressed nuts, hex., tap. or blank, 60 and 10	
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg.....	\$2.30 to 2.55
Cement c'd nails, base per keg.....	2.30 to 2.55

(Concluded on page 662)

CLEVELAND

Steel Buying Takes Slight Turn for the Better —Signs of Further Gains

CLEVELAND, Sept. 2.—The volume of steel business took a slight turn upward the past week, and there are some signs of a more definite improvement. The automotive industry is showing a little more life than during the previous two months, which is indicated by an improvement in orders for alloy steel bars and a gain in inquiry for carbon steel bars. Some forge shops are figuring on automobile work and have put out inquiries to cover their expected requirements in carbon steel bars for the last quarter. The first purchase of sheets for the new Chevrolet cars has been made by the Fisher Body Corporation. While the automotive industry is expected to make a little better showing in September and October than in the past two months, its outlook for the remainder of the year is not very promising.

Steel plant operations in Cleveland have not changed from last week, being at 26 per cent of ingot capacity.

While prices continue weak, a slightly firmer undertone has developed, which may indicate that some of the low prices that have been quoted recently may disappear shortly. However, some of the mills are willing to make contracts for the fourth quarter at the present ruling prices.

Iron Ore

Shipments of Lake Superior ore by water during August amounted to 8,251,691 tons, a falling off from July, when shipments were 8,586,649 tons. There was a decrease of 2,555,268 tons from August last year, or 23.64 per cent. The movement to Sept. 1 was 32,575,921 tons, compared with 43,717,787 tons during the same period last year, or a loss of 11,141,860 tons, or 25.49 per cent.

Strip Steel

Scattered orders for hot-rolled strip from the automotive industry have gained slightly. Prices are unchanged at 1.65c., Pittsburgh, for wide and 1.75c. for narrow strip, although buyers of good tonnages may be able to secure a concession of \$1 a ton. Demand for cold-rolled strip continues very dull. Prices are unchanged at 2.35c. to 2.45c., Cleveland. Weakness has developed in fender stock, with concessions to 3.60c.

Pig Iron

While sales were rather light the past week, there was a slight improvement in inquiry. New shipping orders indicate that there will be some gain in shipments this month over those of August. Some producers shipped 25 per cent more iron last month than in July. Ohio jobbing foundries report that they are figuring on more work than in some time.

Their stocks of iron are very low. A western Ohio foundry which inquired for 1000 to 1500 tons bought only 300 tons.

Prices are unchanged at \$16.75 to \$17, Lake furnace, for foundry and malleable iron for delivery in northern Ohio, \$17 for northern Indiana and \$18 for Michigan. The silicon differentials are not always being maintained. For Cleveland delivery, local furnaces quote \$18.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$18.00
S'th'n fdy., sil. 1.75 to 2.25	\$18.51 to 19.51
Malleable	18.00
Ohio silvery, 8 per cent.	25.50
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

Plates, Shapes and Bars

Orders for structural material show a slight gain and inquiry for fabricated work has improved. Some shops are fairly well filled with work, but others need orders badly, and extremely low prices are being made on fabricated work. While orders for steel bars are still very light, inquiry has improved from shops that are figuring on automotive work. Orders for alloy steel bars in the motor car industry show quite an improvement. Plates continue very dull, although shops doing plate work report considerable inquiry for their products. Inquiries are pending for 340 tons of sheet steel piling for a Toledo dock and 180 tons for the Higbee Store, Cleveland. Steel bars are unchanged at 1.65c., Cleveland, for outside shipment and 1.70c. for local delivery. Structural material ranges from 1.60c. to 1.65c., Pittsburgh, although the lower price probably would be shaded for desirable tonnage. Above 1.60c. for plates has disappeared except for car lots.

Sheets

A drastic revision has been made in differentials on full-finished and auto body sheets and, in addition, a concession of \$2 a ton to 3.50c., Pittsburgh, was made during the week on de-

sirable tonnages. The 50c. per 100-lb. differential for extra deep drawing quality has been replaced by a differential for what will be designated hereafter as "drawing quality." While business has been taken at a new 25c. differential and one mill is still naming this differential, others have fixed their differential at 35c. The designation "drawing quality" will include deep drawing material which has carried a 25c. per 100 lb. extra. Probably 75 per cent of automobile body sheets are of extra deep drawing quality. In addition to the change in quality differentials, the width extra for material 36 in. to 42 in. wide inclusive has been eliminated. This width extra on 20-gage material has been 30c. for 36-in. to 44-in. sheets.

Some of the mills have announced a 3.60c. price for auto body sheets for the last quarter and have withdrawn the 3.50c. price for current orders. Black sheets range from 2.35c. to 2.45c., Pittsburgh, and some of the mills have named the higher price for the fourth quarter.

Orders for approximately 1000 tons of sheets were placed during the week by a local General Motors unit, this being the first release for material for the new Chevrolet bodies.

Old Material

One Valley district mill during the week purchased 3000 tons of heavy melting steel at \$15. The Youngstown market shows a firmer tone, particularly on No. 1 melting steel, and dealers have advanced their prices about 25c. a ton for scrap for delivery to that city, now paying \$14.50 to \$15 for No. 1 material and \$14.50 for compressed sheet steel. Locally, the market continues at a standstill because of the holding up of shipments, and prices are unchanged.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$11.75 to \$12.25
No. 2 heavy melting steel	11.25 to 11.50
Compressed sheet steel	12.25 to 12.50
Light bundled sheet	
stampings	11.00 to 11.50
Drop forge flashings	10.00 to 10.50
Machine shop turnings	8.00 to 8.50
Short shovelling turnings	9.75 to 10.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 bushelling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom	
and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.00 to 9.25
Mixed borings and short	
turnings	9.00 to 9.25
No. 2 bushelling	8.75 to 9.00
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

Warehouse Prices, f.o.b. Cleveland

Base per Lb.	
Plates and struc. shapes	2.95c.
Soft steel bars	2.85c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.40c.
Cold-fin. flats and sq.	3.90c.
Hoops and bands, No. 12 to 14 in., inclusive	3.10c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.10c.
No. 9 ann'l'd wire, per 100 lb.	\$2.50
No. 9 galv. wire, per 100 lb.	2.95
Com. wire nails, base per keg	2.40

*Net base, including boxing and cutting to length.

NEW YORK

Pig Iron Has Better Undertone—Resistance to Low Steel Prices Growing

NEW YORK, Sept. 2.—Notwithstanding the three-day holiday period, pig iron sales totaled 7500 tons, compared with 8500 tons in the previous week. The market has a better undertone and, while there are still few open inquiries, sellers observe a gradual increase in interest on the part of melters. Moreover, specifications show a slight upward trend. The inquiry of the Worthington Pump & Machinery Corporation calling for 500 tons for its Buffalo plant remains unsatisfied, and another lot of 500 tons, not generally advertised, is still before the trade. The largest new inquiry that has definitely come out for figures calls for 700 to 1000 tons. Prices have shown no further significant changes. The Port Henry, N. Y., furnace, which was blown out early in July, will probably be relighted late in October or early in November.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.91
*Buff. No. 2, del'd east. N. J.	19.28
East Pa. No. 2 fdy., sil. 1.75 to 2.25	\$18.89 to 19.39
East Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Finished Steel

Sentiment is more hopeful, although specifications, adversely influenced by the three-day holiday, have shown little expansion. The changing attitude of the trade is indicated by growing resistance on the part of the mills to pressure against prices. This is particularly noticeable in sheets. As low as 2.35c., Pittsburgh, has been done recently on large tonnages of black sheets and automobile body sheets have dipped, in some instances, to 3.50c., but it is predicted that by the end of the week the former will be firm at 2.45c. and the latter at 3.60c. Firmer prices will not come because of marked improvement in buying, but rather because mills have grown tired of taking orders at unprofitable levels, it is stated. Meanwhile, the report persists that a large interest will announce an advance in plates, shapes and bars about Sept. 15. The initial effect of such a step, judging by past experience, would be to drive in business at previous prices. Concessions are still reported in wire nails, although \$2 a keg, Pittsburgh, is the ruling price on most desirable business and smaller lots are commanding \$2.05.

Public undertakings stand out prominently in the construction field. Bids will be taken Sept. 15 on a bridge over the Hackensack and Passaic riv-

ers, New Jersey, requiring 16,000 tons of structural steel. This structure represents part of a projected elevated roadway over the New Jersey meadows, which will take a total of 50,000 tons of steel.

Warehouse Business

Local warehouse distributors of steel products report that August sales were slightly larger in aggregate tonnage than those of July. Price quotations are unchanged, but subject to occasional concessions.

Reinforcing Steel

General contract bids will be taken Sept. 3 on a Passaic River bridge and approaches in Bergen County, New Jersey, requiring 500 tons. The project is in connection with State highway route 4, section 7. A section of State highway leading to the New Jersey side of the Fort Lee bridge will call for 800 tons. General contract bids on the road work and the approaches to the bridge, 700 tons, will be taken Sept. 3. George M. Brewster & Son, Fort Lee, N. J., are low bidders on the general contract for the New Jersey State highway between Hackensack and Arcola, requiring 800 tons of reinforcing. Warehouse prices on concrete bars range

from 2.30c. to 2.50c. a lb., f.o.b. cars, New York. Concrete bars in 40, 50 and 60-ft. lengths for mill shipment are quoted by distributors at 1.75c. to 1.85c. a lb., base Pittsburgh.

Cast Iron Pipe

Miscellaneous orders for small lots constitute the bulk of current business. Utilities continue to specify against contracts placed earlier in the year. Northern pipe plants are holding their operations at 70 to 75 per cent of capacity. A fall upturn in business is looked for, although definite inquiries for sizable tonnages are still lacking.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

Coke

Sellers of foundry coke have not yet been able to discover a definite upward trend in specifications, although sentiment among melters has improved. Prices on furnace coke range from \$2.50 to \$2.60, Connellsville, while quotations on foundry coke follow:

Special brands of beehive foundry coke, \$4.85 a net ton, ovens, or \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

Old Material

While the scrap market retains its undertone of firmness, nothing has occurred to develop any new element of strength. The market stands virtually where it was a week ago, prices and general conditions being unchanged. The holiday interlude undoubtedly had a tendency to check business.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	\$9.00 to \$10.50
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast..	8.00 to 9.00
Stove plate (steel works)...	6.00 to 6.25
Locomotive grate bars....	6.00 to 6.50
Machine shop turnings....	5.00 to 5.25
Short shoveling turnings..	5.00 to 5.50
Cast borings (blast fur. or steel works)	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Steel car axles.....	17.00
Iron car axles.....	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire	7.50
No. 1 railroad wrought...	8.75
No. 1 yard wrought, long..	9.50 to 10.00
Rails for rolling.....	7.00
Stove plate (foundry)....	10.50 to 11.00
Malleable cast (railroad)...	8.50 to 9.00
Cast borings (chemical)...	11.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size.....	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars, small shapes.....	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'd sheets (No. 10).....	3.25c. to 3.40c.
Black sheets (No. 24*).....	3.65c. to 3.90c.
Galvanized sheets (No. 24*).....	4.25c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, ½ x ½ in. and larger..	3.40c.
Smooth finish, 1 to 2½ x ¾ in. and larger	3.75c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller.....	.65
1 x 30 in. and smaller.....	.65
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	.65
¾ x 20 in. and smaller.....	.65
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00
Tin Plate (14 x 20 in.)	
Prime	Seconds
Coke, 100 lb. base box...	\$6.45 \$6.20
Charcoal, per Box—	A AAA
IC	\$9.70 \$12.10
IX	12.00 14.25
IXX	13.90 16.00

PHILADELPHIA

Steel Mill Operations Unchanged— Sheet Mills Seek Higher Prices

PHILADELPHIA, Sept. 2.—Mill operations are unchanged at about 50 per cent of capacity, except for the leading independent interest, which continues at close to 60 per cent. Business in the past week has evidently been greatly curtailed by the holiday, but, with the summer period ended, sellers are looking for some improvement in buying. Meanwhile, prices still lack firmness, except in the case of sheets, producers of which are making a decided effort to eliminate the concessions of \$1 to \$2 a ton widely granted in recent weeks.

Bids were opened today on four ships for the Grace Line and bids are being taken by the Navy Department on two airplane carriers representing a substantial total tonnage of plates, shapes and bars.

Pig Iron

Eastern Pennsylvania furnaces are generally quoting \$18.50 a ton on foundry grade and occasionally \$19 a ton on carload lots. Concessions from \$18.50 are not uncommon, however, when desirable business is offered or competition is encountered from Southern sellers. Birmingham furnaces continue to offer iron to eastern Pennsylvania consumers at \$12 to \$12.50 a ton, furnace, or \$17 to \$17.50 per ton, on dock Philadelphia. With steel mill operations still at a low level, users of basic evidently have a sufficient supply for the present and are only moderately interested in buying additional tonnage. Low phosphorus iron is quiet, except for a recent purchase of about 2000 tons by a steel company at Johnstown.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.26 to \$19.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.76 to 20.26
East. Pa. No. 1X, 2.06 to 2.25 sil.	20.26 to 20.76
Basic (del'd east. Pa.)	18.25 to 18.50
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Steel Bars

Buying of merchant steel continues limited to less than carload lots, and the price is unchanged at 1.60c. a lb., Pittsburgh, or 1.89c., delivered Philadelphia. Substantial reinforcing projects in the market include a cattle pen in West Philadelphia for the Pennsylvania Railroad, requiring 700 tons of bars, and the Market Street subway, Philadelphia, calling for about 1000 tons. Prices of billet steel for reinforcement are unchanged at 1.75c. to 1.85c., Pittsburgh, or 2.04c. to 2.14c.,

delivered Philadelphia. Rail steel bars range from 1.55c. to 1.65c. a lb., Franklin, Pa., or 1.84c. to 1.94c. per lb., delivered Philadelphia.

Shapes

Construction in and near Philadelphia is limited generally to bridges and certain public improvements rather than buildings. So far this year building permits issued in Philadelphia have been only about one-half the total for the same period of 1929. Shape prices still range from 1.60c. to 1.65c. a lb., f.o.b. nearest mill to consumer, or 1.66c. to 1.71c., delivered Philadelphia. Occasionally, on desirable tonnage, 1.60c., mill, is shaded slightly.

Plates

Mill operations are at about 50 per cent of capacity in the rolling departments. The quotation on plates is unchanged at 1.70c. a lb., Coatesville, Pa., or 1.80½c., delivered Philadelphia. Occasionally slight concessions from 1.70c. are granted when orders total considerably in excess of the usual carload lots.

Sheets

Consumers in this district are maintaining operations at the same level as in August. Sheet mills are engaged in an effort to eliminate the concessions of \$1 to \$2 a ton, which have been quite common in recent weeks. As yet there has been no definite test of the strength of the sellers' position. Black sheets are quoted at 2.45c. a lb., Pittsburgh, or 2.74c., Philadelphia, and galvanized, which have been selling at 3c., Pittsburgh, are now quoted at 3.10c., Pittsburgh, or 3.39c., delivered Philadelphia. Blue annealed sheets are quoted at 2.15c. a lb., Pittsburgh, or 2.44c., delivered Philadelphia, for No. 13 gage, and blue annealed plates, No. 10 gage, are 2c.,

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ¼-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Pittsburgh, or 2.29c., delivered Philadelphia.

Imports

In the week ended Aug. 30, 2000 tons of chrome ore arrived at this port from Portuguese Africa and 100 tons of pig iron was received from Belgium. Steel arrivals consisted of 112 tons of structural shapes and 20 tons of steel bars from Belgium, and four tons of hollow drill steel from Sweden.

Old Material

While the market for No. 1 heavy melting steel is apparently firm at \$13 a ton, delivered eastern Pennsylvania, it is difficult to determine the actual strength because of the lack of transactions. While certain buyers evidently believe that purchases can still be made at \$12.50, delivered, it is doubtful that more than a small lot could be obtained at this price, as brokers are paying \$12.50 and more to fill current contracts. Other grades of scrap are inactive and the prices unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00
No. 2 heavy melting steel	\$10.00 to 10.50
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.75 to 9.00
Heavy breakable cast (for steel works)	11.50 to 12.50
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	11.50 to 12.00
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

Sharp Drop in Babbitt Consumption

WASHINGTON, Aug. 29.—Total apparent consumption of Babbitt metal in July was 2,907,977 lb., compared with 3,702,989 lb. in June, and 4,604,786 lb. in July of last year, according to reports received by the Department of Commerce from 31 firms. For the first seven months of 1930 the total apparent consumption was 27,298,481 lb., against 41,092,883 lb. in the like period of last year.

ST. LOUIS Pig Iron Shipments in August Largest Since May—Some Scrap Grades Higher

ST. LOUIS, Sept. 2.—While new buying of pig iron continues in limited volume, and exclusively for early melting, the movement from producers to consumers makes a fair showing. Initial reports covering August indicate that shipments for that month were the largest since May. Users, for the most part, are taking in tonnages due on contracts, and in most instances are melting it currently, accretions to reserves being small. While competition is aggressive, there are fewer reports of price shading. Southern iron can be had at a price figuring back \$12.50, furnace, and the Northern product at \$17. Virtually no fourth quarter inquiry has come to light.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25,	
f.o.b. Granite City, Ill.	\$18.00 to \$18.50
Malleable, f.o.b. Granite City	18.00 to 18.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	16.42 to 16.92
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel

Manufacturers and distributors of sheets report a slight improvement in demand, which comes mainly from the general manufacturing trade. Specifications by the automotive industry and car builders are disappointing. Galvanized sheets, particularly the heavier grades, are moving in better volume to Southern territory. Fabricators have taken only a few small jobs. The Choctaw Culvert & Machinery Co. has been awarded the contract for iron drainage pipe to be used in the Bird's Point-New Madrid, Mo., levee on its bid of \$16,585. Tin plate is moving in about seasonal volume, though cancellations by certain canners have been necessitated by the drought.

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

Per Cent Off List

Tank rivets, $\frac{7}{16}$ -in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Old Material

Considerable irregularity is noted in scrap iron and steel prices. Steel specialties, needed by dealers to apply on contracts, are scarce and slightly higher. Blast furnace material, on the other hand, is dull and lower. Cast borings have dropped to the lowest point in recent years. Malleable and cast grades have not moved in quantities sufficiently large for a gage of the market. Yard stocks are of moderate size, with assortments incomplete. Railroad offerings are larger than recently, latest lists being as follows: Mobile & Ohio, 17 carloads; Missouri Pacific, 154 carloads; Frisco Lines, 20 cars; Chicago Great Western, 20 cars; Big Four, 850 tons; St. Paul, 125 cars; Pennsylvania, 30-265 tons; Nashville, Chattanooga & St. Louis, 15 cars.

BUFFALO Pig Iron Consumers Now Pressing for Shipments—Steel Operations Unchanged

BUFFALO, Sept. 2.—Sales of pig iron in the past week were between 4000 and 5000 tons. Most of the transactions were for 100 tons or less. Producers are cheered by the pressure for immediate delivery that is being exerted by a great many melters. Shipments of iron for storage in the East are proceeding via the barge canal. These shipments are being made steadily.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	\$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.50
Lake Superior charcoal	27.28

Finished Steel

Operations of Buffalo mills are virtually unchanged. The Lackawanna plant of the Bethlehem Steel Co. is operating 15 of 24 open-hearths; the Donner plant of the Republic Steel Corporation is operating four of nine; the Wickwire-Spencer Steel Corporation three of four.

Old Material

The market is very quiet, the only feature being a sale of No. 2 heavy melting steel at a reported price of \$12. A sale of short shoveling steel turnings for blast furnace use was made at \$9.75. An inquiry is out for 1000 tons of No. 1 machinery cast. Shipments of hydraulic compressed sheets and drop forge flashings from Detroit by boat are continuing to come in, and considerable No. 1 heavy melting steel and No. 2 heavy melting steel are being shipped in by barge from the East. An indication that the market for No. 1 busheling may be softer in the near future is seen in the announcement by one of

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel	11.00 to 11.50
No. 2 heavy melting or shoveling steel	10.00 to 10.25
No. 1 locomotive tires	13.00 to 13.50
Misc. stand-sec. rails including frogs, switches and guards, cut apart	12.00 to 12.50
Railroad springs	14.00 to 14.50
Bundled sheets	6.50 to 7.00
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	8.00 to 8.50
Cast iron borings and shoveling turnings	6.00 to 6.50
Iron rails	10.00 to 11.00
Rails for rolling	12.75 to 13.25
Machine shop turnings	6.00 to 6.50
Heavy turnings	9.25 to 9.75
Steel car axles	16.00 to 16.50
Iron car axles	21.50 to 22.00
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	14.00 to 14.50
Steel angle bars	11.75 to 12.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	11.00 to 11.50
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	11.00 to 11.50
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

the larger mills that it will require no more of this grade of material.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$12.75 to \$13.25
No. 2 heavy melting scrap	11.00 to 12.00
Scrap rails	12.00 to 12.50
Hydraulic comp. sheets	11.25 to 12.25
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.25 to 12.50
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	6.00 to 7.00
No. 1 railroad wrought	10.00 to 10.50
Acid Open-Hearth Grades:	
Knuckles and couplers	15.00 to 15.50
Coil and leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Low phos. billet and bloom ends	16.50 to 17.00
Electric Furnace Grades:	
Short shov. steel turnings	9.75 to 10.25
Blast Furnace Grades:	
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 busheling	7.00
Rolling Mill Grades:	
Steel car axles	16.00 to 16.50
Iron axles	19.00 to 19.50
Cupola Grades:	
No. 1 machinery cast	11.00 to 12.00
Stove plate	10.25 to 10.50
Locomotive grate bars	8.25 to 9.25
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	14.25 to 15.25
Railroad	14.25 to 15.25
Agricultural	14.25 to 15.25
Special Grades:	
Chemical borings	11.50 to 12.00

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.20
Black wire, base per 100 lb.	3.50

CINCINNATI Slight Improvement in Demand for Sheets—Pig Iron and Scrap Dull

CINCINNATI, Sept. 2. — While there appears to be no improvement in the demand for pig iron, furnace representatives believe there is a slightly better feeling. The melt is still low, and buyers continue to curtail their orders. Keen competition for business is bringing waivers of differentials and, in some instances, definite price cutting. Bookings last week totaled 1300 tons, all in carload lots for spot shipment.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$20.89 to \$21.39
Ala. fdy., sil. 1.75 to 2.25.. 15.69 to 16.69
Ala. fdy., sil. 2.25 to 2.75.. 16.19 to 17.19
Tenn. fdy., sil. 1.75 to 2.25. 15.69 to 16.69
S'th'n Ohio silvery, 8 per cent 24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Steel

District sheet mills report that, while specific evidence of improvement is lacking, the general feeling among consumers points to some betterment soon. Tonnage last week came from a greater number of consuming fields, and the total showed a slight increase over that of the preceding week. A slight improvement in automotive demand was indicated in last week's orders.

Old Material

Scrap dealers are divided in opinion as to prospects of improvement and are holding bids at last week's quotations.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops.....	3.90c.
Bands.....	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares.....	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	4.20c.
Small rivets.....	60 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$16.50
4-in.....	34.50
Seamless steel boiler tubes, 2-in.....	17.50
4-in.....	36.00

tions. The Norfolk & Western Railroad is offering about 2750 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.25 to \$11.75
Scrap rails for melting.....	12.00 to 12.50
Loose sheet clippings.....	7.75 to 8.25
Bundled sheets.....	9.75 to 10.25
Cast iron borings.....	7.75 to 8.25
Machine shop turnings.....	7.25 to 7.75
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.50 to 14.00
No. 2 railroad wrought.....	11.25 to 11.75
Short rails.....	17.00 to 17.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	17.50 to 18.00
No. 1 railroad cast.....	14.50 to 15.00
Burnt cast.....	8.25 to 8.75
Stove plate.....	8.25 to 8.75
Brake shoes.....	8.25 to 8.75
Agricultural malleable.....	14.00 to 14.50
Railroad malleable.....	15.00 to 15.50

minimum now being 3.20c. Other finished steel prices are without change. The Tennessee company has taken off one open-hearth furnace at Fairfield, leaving four active, the same number as at Ensley. With three being operated by the Gulf States Steel Co., the active total for the district is 11. Structural steel demand is light, small jobs being the only class of work that is holding up. Reinforcing bar manufacturers report a little improvement in demand for tonnages of 50 tons or less.

Coke

Both production and shipments during August were the lowest in months. Light buying is anticipated for the fourth quarter as a result of the meager consumption and heavy balance of unused contracts. The price remains at \$5 a net ton, Birmingham.

Old Material

Activity is confined to light specifications of steel mills on old contracts. There are no inquiries that show promise of early buying. With the exception of two or three large steel mills, consumer yards are almost bare. All quotations are the same.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings.....	9.00
Cast iron borings.....	9.00
Stove plate.....	11.50 to 12.00
Steel axles.....	20.00
Iron axles.....	23.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	14.50
No. 1 cast.....	13.00
Tramcar wheels.....	12.50
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem.....	13.50 to 14.00

BIRMINGHAM Pig Iron Shipments Have Gained Since Early August—Steel Demand Steady

BIRMINGHAM, Sept. 2.—From the standpoint of new business, the pig iron market is the quietest it has been in months, a sprinkling of small spot orders being about the only new tonnage. Shipments show no change this week, but they are slightly heavier than in early August. Two or three large pressure pipe shops have increased specifications. Other increases in melt during August have been negligible. There are no inquiries to speak of, either for September or for the fourth quarter. The base price of \$14, Birmingham, is for September delivery only. Active furnaces total 13, the same as last week. Of this number nine are on foundry iron, three on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil..... \$14.00
No. 1 fdy., 2.25 to 2.75 sil..... 14.50
Basic 14.00

Cast Iron Pipe

Pressure pipe manufacturers report distinct indications that the recently improved market will hold out for the remainder of the year. Small ton-

nages have played an important part in supporting the market and inquiries along this line are still active. August has seen substantial reductions of pipe at makers' yards and an improvement in business would likely bring about increased production. A project at Hollywood, Fla., calling for 9500 ft. of 8-in. pipe and 2500 ft. of 6-in. pipe has been postponed until Sept. 17. Greenville, Ala., opened bids Aug. 29 on about 200 tons, and Spartanburg, S. C., opened bids the same day for an important tonnage. Quotations continue at \$37 to \$38 a ton, Birmingham.

Finished Steel

Inquiries continue to average well and orders are following them closely at about the same rate as in the past three weeks. Sheet shipments in August showed a gain of a few tons as compared with August last year. Inquiries are still coming in, but with less frequency. The wire products market shows prospects of improvement in September, following an unusually dull August. Quotations on galvanized sheets are off \$1 a ton, the

Heavy Melting Scrap Is Up 25c. at Detroit

DETROIT, Sept. 2.—Heavy melting steel and hydraulic compressed sheet have advanced 25c. a ton, largely on account of the fact that little material is available and dealers therefore are bidding more vigorously for desirable lots. Sluggishness in foundry operations, on the other hand, has caused weakness in cast iron grades, with No. 1 machinery cast and automotive cast selling at 25c. and \$1 a ton respectively less than a week ago. September scrap lists of automobile companies are light and point to only a slight gain in production this month as compared with August.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$11.25 to \$11.75
Borings and short turnings.....	6.00 to 6.50
Long turnings.....	5.75 to 6.25
No. 1 machinery cast.....	11.00 to 11.50
Automotive cast.....	12.50 to 13.00
Hydraul. comp. sheets.....	11.00 to 11.50
Stove plate.....	9.00 to 9.50
New No. 1 busheling.....	9.50 to 10.00
Old No. 1 busheling.....	8.75 to 9.25
Sheet clippings.....	8.00 to 8.50
Flashings.....	10.00 to 10.50

BOSTON

Structural Steel Outlook Fairly Good—Heavy Melting Scrap Is Higher

BOSTON, Sept. 2.—Pig iron sales the past week totaled about 2500 tons, of which Buffalo district furnaces took more than half. Excepting one sale of 500 tons of Buffalo iron to a Connecticut foundry, individual transactions were in small lots and mostly for September delivery. Buffalo No. 2 plain, No. 2X and No. 1X iron is still available at \$16 a ton, furnace, but occasionally No. 1X brings an extra of 50c. A Virginia furnace is reported to have canvassed the market thoroughly, but has obtained little business.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	\$20.28
†Buffalo, sil. 2.25 to 2.75	\$20.28 to 20.78
*Buffalo, sil. 1.75 to 2.25	20.91
*Buffalo, sil. 2.25 to 2.75	20.91 to 21.41
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	22.61
*Ala., sil. 2.25 to 2.75	23.11
†Ala., sil. 1.75 to 2.25	18.75
†Ala., sil. 2.25 to 2.75	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Fabricated Steel

The feature of the fabricated structural steel market the past week was the closing of bids by the State of Maine for a bridge between Waldo and Hancock, involving 2000 tons of material. The American Bridge Co. was low at \$510,000; the Phoenix Bridge Co. was second at \$535,666, and the Bethlehem Steel Co. third at \$647,319. There were no other bidders. Local fabricating shops generally have sufficient business on their books to carry them well into the fourth quarter, and sufficient business is in

sight, if evenly distributed, to assure a well rounded out final quarter.

Reinforcing Steel

Sales the past week of billet bar stock probably did not exceed 300 tons, of which 85 tons for a Lowell, Mass., post office taken by Joseph T. Ryerson & Son, Inc., was the largest transaction. Quite a little tonnage is hanging over the market and probably will be closed shortly. It is also expected that a round tonnage of rail bars will be soon purchased for Boston-Worcester, Mass., road work. Prices on billet steel bars are: One to 5 ton lots, 3.15c. a lb., base, from stock; 6 to 99 tons lots, 2.65c.; 100-ton lots and larger, 2.55c. Rail steel bars are 2.26½c. a lb., delivered common Boston freight rate points.

Old Material

Reflecting the strength shown in the Pittsburgh market for No. 1 heavy melting steel, local quotations for that material are firmer, brokers in general now offering \$9.50 a ton, on cars shipping point. One firm,

heretofore offering \$9.05 a ton, has raised its price to \$9.25, and still another is offering \$9.55. Little heavy steel is available, however. Only occasional cars of other grades are moving. The market for No. 1 machinery cast for Pittsburgh shipment is now \$7.25 a ton, on cars shipping point, compared with \$7 a week ago. A local concern this week loaded 600 tons of scrap rails for export to Japan.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$9.25 to \$9.55
Scrap T rails.....	8.60 to 9.00
Scrap girder rails.....	7.60 to 7.75
No. 1 railroad wrought....	7.00 to 7.50
Machine shop turnings....	4.10 to 4.35
Cast iron borings (steel works and rolling mill)	4.10 to 4.35
Bundled skeleton, long....	6.10 to 6.50
Forge flashings.....	7.25 to 7.75
Blast furnace borings and turnings	3.10 to 3.60
Forge scrap.....	6.10 to 6.50
Shafting	13.50 to 14.50
Steel car axles.....	16.50 to 17.50
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.60
Rails for rolling.....	9.00 to 9.25
Cast iron borings, chemical	9.10 to 9.60

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$11.50 to \$12.00
No. 1 machinery cast.....	13.00 to 14.00
No. 2 machinery cast.....	11.00 to 11.50
Stove plate.....	8.50 to 9.50
Railroad malleable.....	16.00 to 16.25

CANADA

Structural Steel Moderately Active Amid General Dullness of Business

TORONTO, Sept. 2.—While there appears to be a stronger undertone in the Canadian pig iron market, sales are still in small tonnages for spot delivery. Some of the betterment that appeared in the market a week ago held throughout a part of the past week, with the result that sales for the period were around 1000 tons. The lack of demand from Canadian melters has been reflected in a general dropping off in imports, particularly those from Great Britain. At the present time it is stated that supplies of Summerlee and Carron iron in warehouses at Montreal are at the lowest point in years. The restricted demand for warehouse grades has resulted in warehouse prices being dropped from price lists, and quotations are only available on special request.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50

Structural Steel

This market appears to be the bright spot in the iron and steel industry. In the past month or six weeks business has shown renewed life and fabricators are again on full production in some districts. Much of the improvement, however, is in British Columbia and Quebec, and is due mostly to contracts for bridge steel. The Dominion Bridge Co. has

closed a contract for 2500 tons of steel for a bridge over the Fraser River at Lillooet, B. C., for the Pacific Great Eastern Railway. The Eastern Canada Steel & Iron Works, Lesage, Que., has a contract for 400 tons of steel for bridge over the St. Charles River at Quebec. Bids will be closed Oct. 31 for steel contracts in connection with highway and railroad bridge over False Creek, B. C., for city of Vancouver, B. C., to cost \$2,800,000.

Old Material

Some improvement in sales was reported by local scrap dealers during the week. Mills were in the market for heavy melting steel and turnings in small lots. In the Montreal market, trading continues dull. Dealers are showing little interest in the market and are acquiring material only for direct shipment to consumers. Prices are unchanged.

Dealers' buying prices for old material:

Per Gross Ton		
	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00
Rails, scrap.....	10.00	8.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings....	6.00	5.00
Boiler plate.....	7.00	6.50
Heavy axle turnings.....	7.00	6.00
Cast borings.....	6.50	5.00
Steel borings.....	6.50	6.00
Wrought pipe.....	4.00	4.00
Steel axles.....	10.00	13.00
Axles, wrought iron.....	12.00	15.00
No. 1 machinery cast.....	12.00	12.00
Stove plate.....	10.00	10.00
Standard carwheels.....	10.50	10.50
Malleable	10.00	10.00
Per Net Ton		
No. 1 mach'ry cast.....	11.00	.....
Stove plate.....	9.00	.....
Standard carwheels.....	10.00	.....
Malleable scrap.....	9.00	.....

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined.....	4.60c.
Norway rounds	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.

Per Cent Off List

Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

PACIFIC COAST

SAN FRANCISCO, Aug. 30.—(By Air Mail)—Sales and inquiries, with few exceptions, were confined to small lots. Outstanding among awards were 1200 tons of structural steel shapes for a plant at Trona, Cal., for the American Potash & Chemical Co., secured by the Consolidated Steel Corporation, and 783 tons of cast iron pipe for Glendale, Cal., most of which was placed with the National Cast Iron Pipe Co. Little change has occurred recently in the price structure.

Steel Bars

Awards of reinforcing bars were confined to lots of less than 100 tons. While a fair-sized tonnage is involved in pending business no new inquiries of importance came up for figures during the week. The largest inquiry calls for 2000 tons for the Burrard Street bridge, Vancouver, B. C. In the San Francisco district 2.50c., base, applies on carload lots on out-of-stock business. Demand for mild steel bars is by no means heavy, the majority of sales involving small tonnages. On this class of material, 2.35c., c.i.f. is being quoted generally.

Plates

Plate demand is exceptionally quiet, awards this week involving small lots only. It is reported that the General Terminal Corporation has placed 100 tons for tanks with a Los Angeles fabricator. The Chicago Bridge & Iron Works secured a 30,000-gal. steel tank on a 105-ft. tower for the Stockton Firebrick Co. at Pittsburg, Cal. The largest pending project calls for 2000 tons for a pipe line at Anacortes, Wash., bids on which will be opened Sept. 5. Prices continue to range between 2.15c. to 2.25c., c.i.f. coast ports.

Structural Steel

Among the larger awards of structural steel were 300 tons for an apartment house on California Street, San Francisco, booked by the Golden Gate Iron Works, and 175 tons for a department store in Oakland, secured by the Judson-Pacific Co. Bids are being taken on 400 tons for a plant at Pittsburg, Cal., for the Stockton Firebrick Co. Pending business exceeds 10,000 tons. No change in quotations on shapes has occurred recently, 2.15c. to 2.25c. being the range.

Cast Iron Pipe

Cast iron pipe awards aggregated more than 1200 tons. The National

Small-Lot Orders Make Up Bulk of Steel Business

Pig iron prices per gross ton at San Francisco:

*Utah basic	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Cast Iron Pipe Co. took 714 tons of 6 to 12-in. Class 250 pipe for Glendale, Cal., and the Pacific States Cast Iron Pipe Co. booked 69 tons of 6-in. Class 250 pipe for the same city. The Fresno County Waterworks District No. 1 placed 504 tons of 4 to 8-in. Class 150 pipe with the Edgley Co. of Los Angeles. New inquiries include 525 tons of 24-in. Class B pipe for Los Angeles, bids on which will be opened Sept. 10, and 104 tons of 4 and 6-in. Class 150 pipe for Whittier, Cal., bids on which will be opened Sept. 8.

To Build Five Tankers

WASHINGTON, Sept. 2. — The Sun Shipbuilding & Dry Dock Co., Chester, Pa., will build five motor tankers of approximately 9000 gross tons each for the Motor Tankship Corporation, which has just been loaned \$1,265,625 for each tanker by the Shipping Board. This is the second series of loans made by the Shipping Board to the Motor Tankship Corporation for tanker construction. Last September loans were authorized for five motor tankers of approximately 13,450 deadweight tons each. Contracts for these, also, were placed with the Sun Shipbuilding & Dry Dock Co., and it is understood that four have already been completed. Loans authorized on the first group amounted to \$1,260,937 per vessel.

Detroit Buys Welded Iron Water Supply Line

The Department of Water Supply of Detroit has awarded another large contract for electric welded pipe, this one covering 2100 tons or 13,700 ft. The pipe will be laid by A. Phelps & Son, Detroit, after fabrication by the United Welding Co., Middletown, Ohio. The design calls for ½-in. Armeo ingot iron plates 122 x 173¼ in and 122 x 212 in.

The pipe will be delivered in 40-ft. lengths for the 54-in. and 30-ft. lengths for the 66-in. lines. The 40-ft. lengths will be made of four plates. In 7000 ft. of 54-in. pipe, this increase of 10 ft. per section will result in a large reduction of field joints with accompanying economy in field work.

The pipe will be formed like the old-fashioned riveted pipe. The circular seams lapped approximately 1½ in. will be welded inside and out, while the longitudinal seams will be butt-

welded. In and out courses will be used throughout each section of the pipe. The sections will be tested for tightness and the surface cleaned and dipped in protective coating before shipment.

The order, which totals over \$432,000, calls for 7100 ft. of 54-in. and 5600 ft. of 56-in. pipe.

W. H. Davey and Associates Buy Canton, Ohio, Mill

W. H. Davey, chairman of the board of the Empire Steel Corporation, Mansfield, and associates have purchased the tin mill plant in Canton, Ohio, formerly owned by the Falcon Tin Plate Co., and more recently owned by the Canton Rolling Mills Corporation. Samuel Davey and W. R. Jenkins, who have been connected with the Empire Steel Corporation, will be associated with Mr. Davey in a new company which will be formed to operate the plant.

Its equipment includes four 28-in. sheet mills, eight 26-in. cold mills, nine black plate mills and eight stands of cold rolls. The plant will be reconditioned and used for the manufacture of tin plate and tin plate specialties. Its rated capacity is 32,000 tons of black plate for tinning, 720,000 base boxes of coke tin plate and black plate specialties.

Granite City Steel Names Pacific Coast Agents

The Granite City Steel Co., Granite City, Ill., through Laurence F. Miller, vice-president in charge of sales, announces the appointment of Ambler & Garnjost, San Francisco and Los Angeles, as its district sales representatives on the Pacific Coast.

A. B. Ambler, senior partner, with offices at 444 Market Street, San Francisco, has spent many years on the Pacific Coast in the commercial end of the steel industry, and is known by practically all steel buyers in that district.

A. E. Garnjost, with headquarters in the San Fernando Building, Los Angeles, has been engaged in selling on the Pacific Coast for 15 years, for the last six years having been located at Los Angeles. On March 1 of this year he was made a partner in the firm.

Joseph Michaels of Hyman Michaels Co., Chicago, has been appointed to represent the Institute of Scrap Iron and Steel as a national councillor in the Chamber of Commerce of the United States. Benjamin Schwartz, director general of the institute, has been designated as a delegate to the United States Chamber. The Department of Natural Resources of the United States Chamber is making a study of the problems of the scrap iron industry, because of their relation to the conservation of important natural resources of the United States.

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, ½-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c't'd nails, 100 lb. keg.....	3.35

▲▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲▲

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

Sheet Bars	
(Open Hearth or Bessemer)	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Slabs	
(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Skelp	
(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Wire Rods	
(Common soft, base)	Per Gross Ton
Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
Per Unit	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	.8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	11c.
Iron ore, basic Swedish, average 65% iron	9c.
Manganese ore, washed 52% manganese, from the Caucasus	.26c. to .28c.
Manganese ore, Brazilian, African or Indian, basic 50%	.26c. to .28c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$14.00
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ delivered	.50c. to .55c.

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard	\$94.00 to \$99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$33.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
Per Gross Ton	
Furnace	Furnace
10%	\$35.00
11%	37.00
12%	14 to 16%

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
10%	\$26.50
11%	28.50
12%	30.50

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	Per Gross Ton
6%	\$21.50
7%	22.00
8%	22.50
9%	23.50
10%	24.50
11%	25.00
12%	25.50

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys	
Ferrotungsten, per lb. contained metal del'd	\$1.30 to \$1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	\$2.50

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-Heat	Intermediate
Duty Brick	Heavy Duty Brick
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville	\$2.60 to \$2.65
Foundry, f.o.b. Connellsville	3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.35
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, 1/4-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.80 to .90
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	Per Cent Off List
Machine bolts	.73
Carriage bolts	.73
Lag bolts	.73
Flow bolts, Nos. 1, 2, 3 and 7 heads	.73
Hot-pressed nuts, blank or tapped, square	.73
Hot-pressed nuts, blank or tapped, hexagons	.73
C.p.c. and t. square or hex. nuts, blank or tapped	.73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 3/4 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts	.73
Semi-finished hexagon castellated nuts, S.A.E.	.73
Stove bolts in packages, P'gh	.80, 10, 10 and 5
Stove bolts in packages, Chicago	.80, 10, 10 and 5
Stove bolts in packages, Cleveland	.80, 10, 10 and 5
Stove bolts in bulk, P'gh	.80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago	.80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland	.80, 10, 10, 5 and 2 1/2
Tire bolts	.60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets	
(1/2-in. and larger)	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$2.75
F.o.b. Chicago	2.85

Small Rivets	
(1/8-in. and smaller)	Per Cent Off List
F.o.b. Pittsburgh	.70, 10 and 5
F.o.b. Cleveland	.70, 10 and 5
F.o.b. Chicago	.70, 10 and 5

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	Per Cent Off List
Milled cap screws	.80, 10, 10 and 5
Milled standard set screws, case hardened	.80 and 5
Milled headless set screws, cut thread	.75 and 10
Upset hex. head cap screws, U.S.S. thread	.85 and 10
Upset hex. cap screws, S.A.E. thread	.85 and 10
Upset set screws	.80, 10 and 5
Milled studs	.70

Fabricated Structural Steel

New Projects of 71,000 Tons Include 16,000-Ton Bridge and 19,000-Ton Building—Awards Only 30,500 Tons

FABRICATED steel projects reached a total this week of almost 71,000 tons, the largest since early in June. Of this total, more than 28,000 tons is bridge construction for railroads, States and counties, including 16,000 tons in a bridge for the State of New Jersey over the Hackensack and Passaic rivers, 3500 tons in highway bridges for West Virginia, and 1740 tons in an approach to the Hudson River bridge at Fort Lee, N. J. Other large work included in the total is 19,000 tons for the New England Building in Boston, 4000 tons for a bank building in Dayton, Ohio, and 3000 tons in a Chicago public school.

Awards totaling about 30,500 tons were slightly less than the weekly average for the year and compare with 40,000 tons reported in the previous week. A substantial part of the total was in St. Louis, where 6600 tons was placed for a subway and 5000 tons for a railroad terminal. Other awards included 5000 tons for the Security Bank Building, Kansas City, Mo., 2000 tons for a bridge at Bucksport, Me., and 2100 tons for a bridge on the Moosehead, Me., division of the Canadian Pacific Railway.

North Atlantic States

BUCKSPORT, ME., 2000 tons, Waldo-Hancock bridge, to American Bridge Co.
MEXICO-PERU, ME., 370 tons, Androscoggin River bridge, to Boston Bridge Works, Inc.
WATERVILLE, ME., 125 tons, boiler house, to New England Structural Co.
WAREHAM, MASS., 125 tons of plates, standpipe, to Petroleum Iron Works Co.
BOSTON, 110 tons, Quincy Market Cold Storage & Warehouse Co. addition, to unnamed fabricator.
BOSTON & MAINE RAILROAD, 110 tons, bridge, to Boston Bridge Works, Inc.
CANADIAN PACIFIC RAILWAY, 2100 tons, bridges for Moosehead, Me., Division, to Bethlehem Steel Co.
NEW YORK, 800 tons slabs and grilles for New York Central Railroad at West Sixty-third Street, to McClintic-Marshall Co.
NEW YORK, 1200 tons, building at Wall and Front Streets, to Post & McCord.
NEW YORK, 1300 tons, 27-story building at Beaver and Hanover Streets, to Post & McCord.
NEW HAVEN, CONN., 640 tons, Sterling Hall of Medicine, to Shoemaker Bridge Co.
WASHINGTON, 520 tons, intake screens, to Virginia Bridge Co.
MIDLAND, PA., 300 tons, factory, to McClintic-Marshall Co.
BALTIMORE, 100 tons, bakery, to Dietrich Brothers.
BALTIMORE, 100 tons, approach to Lee Street Bridge, to Bethlehem Steel Co.
POTTSTOWN, PA., 300 tons, Hill School, to McClintic-Marshall Co.

The South

STATE OF VIRGINIA, 100 tons, highway bridges, to American Bridge Co.
STATE OF WEST VIRGINIA, 175 tons, highway bridge, to Wheeling Structural Steel Co.

Central States

CHILLICOTHE, OHIO, 100 tons, school, to Hiner Structural Steel Co.
DETROIT, 110 tons, warehouse for Crucible Steel Co., to Mahon Structural Steel Co.
CHICAGO, 100 tons, Goldblatt Building, to an unnamed bidder.
NILES CENTER, ILL., 400 tons, car shop for Chicago Rapid Transit Lines, to an unnamed bidder.
ST. LOUIS, 6600 tons, subway, to McClintic-Marshall Co.
ST. LOUIS, 5000 tons, railroad terminal building, to American Bridge Co.

KANSAS CITY, MO., 5000 tons, Security Bank building, to Kansas City Structural Steel Co.
KANSAS CITY, 1000 tons, 66 gas line pump houses, awarded by Continental Construction Co. to Mississippi Valley Structural Steel Co.

Western States

TRONA, CAL., 1200 tons, plant for American Potash & Chemical Co., to Consolidated Steel Corporation.
OAKLAND, CAL., 175 tons, department store, Twentieth Street and Broadway, to Judson-Pacific Co.
SAN FRANCISCO, 300 tons, apartment building, California and Octavia Streets, to Golden Gate Iron Works.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

FRANKLIN, N. H., 270 tons, bridge.
CAMBRIDGE, MASS., 185 tons, Harvard College biological laboratory.
WESTON, MASS., 125 tons, Boston & Maine Railroad bridge.
BOSTON, 19,000 tons, New England Building.
BOSTON, 2000 tons, professional arts building.
STATE OF NEW JERSEY, 16,000 tons, bridge over Hackensack and Passaic Rivers, part of elevated roadway over New Jersey Meadows involving 50,000 tons; bids Sept. 15.
PHILADELPHIA, 1000 tons, warehouse for Auto-Car Sales Co.
FORT LEE, N. J., 1740 tons, approach to Hudson River bridge.
NEW YORK, 800 tons, loft building, Thirtieth Street and Seventh Avenue.
PHILADELPHIA, 1400 tons, garage for Murphy-Quigley Co.
STATE OF NEW JERSEY, 202 tons, bridge over Passaic River.
NEW YORK, 150 tons, exit concourse deck for Pennsylvania station.
SCOTSDALE, PA., 250 tons, bridge, Pittsburgh & West Virginia Railroad Co.
PRINCEDALE, PA., 600 tons, bridge for Monessen Southwestern Railroad Co.
BEVERLY, MASS., 300 tons, warehouse for Gulf Refining Co.
NEW YORK CENTRAL RAILROAD, 300 tons, grade crossing elimination.
NIAGARA FALLS, N. Y., 500 tons, Hyde Park school.
BUFFALO, 200 tons, marine airport.
BUFFALO, 200 tons, school addition.
FRANKLIN, PA., 225 tons, building for Hughes Foulkrod Co.

OTTSVILLE, PA., 250 tons, addition to Court House.

The South

TURNBULL, LA., 430 tons, bridge for Texas Pacific Railroad.
STATE OF WEST VIRGINIA, 3500 tons, highway bridges over Kanawha River.
BOWLING GREEN, KY., 500 tons, power house.
LOUISVILLE & NASHVILLE RAILROAD, 1000 tons, bridges.
DALLAS, TEX., 800 tons, Y. M. C. A. building.

Central States

CLEVELAND, 560 tons, warehouse for New York Central Railroad.
TOLEDO, 120 tons, warehouse extension for Goodyear Tire & Rubber Co.
STEUBENVILLE, OHIO, 800 tons, extension to open-hearth department, Wheeling Steel Corporation.
YOUNGSTOWN, 900 tons, Mahoning Valley purification plant.
COLUMBUS, OHIO, 300 tons, teachers' building for Ohio State University.
YOUNGSTOWN, 1000 tons, transmission towers for Ohio Edison Co.
STEUBENVILLE, OHIO, 300 tons, theater and office building.
COLUMBUS, OHIO, 500 tons, union station.
CINCINNATI, 250 tons, Wilson Auditorium for University of Cincinnati.
DAYTON, 4000 tons, Mutual Home Bank building.
MAYSVILLE, MICH., 350 tons, addition to Detroit-Edison Co. power house.
MONEE, ILL., 300 tons, highway bridge.
CHICAGO, 3000 tons, public school, Berry and Melvina Streets.
SPRINGFIELD, ILL., 1500 tons, State highway bridges; bids to be opened Sept. 10.
MILWAUKEE, 1200 tons for A. O. Smith Corporation.
CHICAGO & ALTON, 100 tons, deck girder spans at Alton, Ill.
MILWAUKEE ROAD, 150 tons, station trestle bridge.
WILMETTE, ILL., 500 tons, Bahai Temple; George A. Fuller Co., low bidder on general contract.
STATE OF MISSOURI, 600 tons, five highway bridges in Davies County.

Western States

TULSA, OKLA., 550 tons, Post Office extension.
TONKE, ARK., 375 tons, highway bridge.
CROW CREEK, WYO., 700 tons, bridge for Union Pacific.
PITTSBURG, CAL., 400 tons, plant for Stockton Firebrick Co.; bids being taken.
WALNUT CREEK, CAL., 150 tons, bridge over Snodgrass Slough; bids opened.

Sheet and Tin Mill Wage Rates Are Reduced

Tonnage rates for workers in Midwestern sheet and tin plate mills, operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers, sustain a reduction of 4½ per cent for September-October, as compared with July-August.

The cut carries such rates to the lowest point in several years. It follows bi-monthly examination of sales sheets, which revealed a reduction in average selling price of Nos. 26, 27 and 28-gage black sheets.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper Inactive—Tin Stagnant—Lead Steady— Zinc Stronger

NEW YORK, Sept. 2.

With all markets closed on Labor Day, Sept. 1, as well as on Saturday, Aug. 30, demand for all metals has been very light. In general, prospects for September appear brighter than at the beginning of either July or August.

Copper.—A deadlock still prevails in this market. All but two companies, both of them custom smelters, still adhere to 11c., delivered in the Connecticut Valley, for electrolytic copper, with metal at 10.75c. available from the two companies only on bids. Very little metal was sold to domestic consumers during the week. Little activity is expected until a more definite trend is indicated. The quotable range for electrolytic copper is therefore 10.75c. to 11c., delivered in the Connecticut Valley.

Demand from abroad this month starts out well with 2500 tons for the first two days, but activity from that source is not expected until something more definite as to price trends is evident in the domestic market. Sales abroad for August are estimated at about 23,000 gross tons, which compares with about 63,000 tons for July, when buying was very heavy. Domestic consumers are pretty well covered two months ahead at least, with foreign consumers fairly well contracted for September. Lake copper is very quiet at 11c. to 11.12½c., delivered.

Copper Averages.—The average price of Lake copper for August, based on daily quotations in THE IRON AGE, was 11.12½c., delivered New York. The average price of electrolytic copper was 10.65c., refinery, or 10.90c., delivered in the Connecticut Valley.

Tin.—Demand is almost nil in a stagnant market. Quotations for spot Straits tin continue to hover around 30c., with the price today at 29.75c., New York. In London quotations are a little higher than a week ago, with spot standard quoted at £133 12s. 6d., future standard at £135 7s. 6d., and spot Straits at £135 5s. The Singapore price today was £138. Deliveries into consumption in the United States during August were smaller than expected, at 5695 tons. There was an increase in the world's visible supply during August of 1855 tons, bringing the total to the phenomenally large figure of 43,805 tons. Stocks in London warehouses for the week ended Saturday, Aug. 30, showed an increase of only 25 tons, the smallest in some time, bringing the total to 25,326 tons.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 2	Aug. 29	Aug. 28	Aug. 27
Lake copper, New York.....	11.12½	11.12½	11.12½	11.12½
Electrolytic copper, N. Y.*.....	10.50	10.50	10.50	10.50
Straits tin, spot, N. Y.	29.75	29.87½	30.25	29.95
Zinc, East St. Louis.....	4.35	4.30	4.30	4.30
Zinc, New York.....	4.70	4.65	4.65	4.65
Lead, East St. Louis.....	5.35	5.35	5.35	5.35
Lead, New York.....	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Lead.—Demand is spasmodic and confined to carload and small lots for early delivery. Prices continue firm at 5.35c., St. Louis, from the leading producer in that district, with a little metal available at 5.30c. The leading interest continues to quote 5.50c., New York, as its contract price.

Zinc.—Prime Western zinc is a little firmer, sales having been made at 4.35c., East St. Louis. Demand continues very small and a fair test of the market is lacking. Possibly metal could still be bought in small quantities at 4.32½c. The ore price continues unchanged at \$30 to \$31, Joplin.

Antimony.—Demand for Chinese metal continues quiet, with spot metal quoted at 7.75c. to 7.87½c. and futures at 7.62½c.

Nickel.—Quotations long established continue unchanged with ingot nickel in wholesale lots at 35c. a lb., with shot

nickel at 36c. and with electrolytic nickel in cathodes at 35c.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 2.—This market is one which is characterized by greater steadiness of prices as sales climb slowly upward. Prices for tin are slightly higher following a week during which quotations fluctuated rapidly in a small spread. The old metal market is moderately active. *Prices per lb., in carload lots:* Lake copper, 11.125c. to 11.25c.; tin, 30.50c.; lead, 5.45c.; zinc, 4.40c.; in less-than-carload lots, antimony, 8.87½c. On old metals we quote copper wire, crucible shapes and copper clips, 9c.; copper bottoms, 7.25c. to 7.75c.; red brass, 7.25c. to 7.75c.; yellow brass, 5c. to 5.50c.; lead pipe, 4c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 17.50c.; block tin, 22.50c.; aluminum, 7c. to 7.50c.; all being dealers' prices for less-than-carload lots.

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass.....	17.75c.
Copper, hot rolled, base sizes.....	20.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	23.00c.
Seamless Tubes—	
Brass.....	22.75c.
Copper.....	23.00c.
Brass Rods.....	16.12½c.
Brazed Brass Tubes.....	25.37½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks.....	9.75c. to 10.25c.
Zinc sheets, open.....	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	32.00c. to 33.00c.
Tin, bar.....	34.00c. to 35.00c.
Copper, Lake.....	12.75c.
Copper, electrolytic.....	12.50c.
Copper, casting.....	12.25c.
Zinc, slab.....	6.25c. to 7.25c.
Lead, American pig.....	6.50c. to 7.00c.
Lead, bar.....	8.50c. to 9.00c.
Antimony, Asiatic.....	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys.....	23.00c. to 24.00c.
Babbitt metal, commercial grade.....	25.00c. to 35.00c.
Solder, ½ and ⅓.....	22.50c. to 23.50c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	35.00c.
Tin, bar.....	37.00c.
Copper, Lake.....	12.25c.
Copper, electrolytic.....	12.25c.
Copper, casting.....	11.75c.
Zinc, slab.....	5.75c. to 6.00c.
Lead, American pig.....	6.25c. to 6.50c.
Lead, bar.....	8.75c.
Antimony, Asiatic.....	12.50c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	38.00c.
Solder, ½ and ⅓.....	21.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.00c.	10.00c.
Copper, hvy. and wire	8.75c.	9.75c.
Copper, light and bottoms.....	7.50c.	8.50c.
Brass, heavy.....	5.00c.	6.25c.
Brass, light.....	4.50c.	5.75c.
Hvy. machine composition.....	7.75c.	8.75c.
No. 1 yel. brass turnings.....	5.50c.	6.50c.
No. 1 red brass or compos. turnings...	7.00c.	8.00c.
Lead, heavy.....	4.25c.	4.75c.
Lead, tea.....	3.00c.	3.50c.
Zinc.....	2.25c.	2.75c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

Reinforcing Steel

Awards and Inquiries Light

REINFORCING steel awards the past week, at 475 tons, were the smallest of the year. New projects were also light, totaling 2900 tons. Lettings for August amounted to 25,500 tons, compared with 25,600 tons for July. Awards follow:

POTTSVILLE, PA., 150 tons, gymnasium for Hill School, to McClintic-Marshall Co.
CHICAGO, 325 tons, Monroe Street sewer, to Concrete Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BERGEN COUNTY, N. J., 500 tons, State highway section 7, route 4, Passaic River bridge and approaches; general contract bids taken Sept. 3.
BERGEN COUNTY, N. J., 800 tons of pavement and 700 tons for approaches to Fort Lee bridge; general contract bids taken Sept. 3.
HACKENSACK, N. J., 800 tons, State highway to Arcola; George M. Brewster & Son, Fort Lee, N. J., low bidder on general contract.
PHILADELPHIA, 1000 tons, Market Street subway.
PHILADELPHIA, 700 tons, cattle pens in West Philadelphia for Pennsylvania Railroad.
CHICAGO, tonnage being estimated, men's dormitory at University of Chicago.
COOK COUNTY, ILL., 600 tons, highway bridges; Paschen Brothers and Albrecht Co., low bidders on general contracts for 300 tons each.

Lends Specially Designed Locomotive for Trials

A new eight-drive wheel locomotive has been built for the Timken Roller Bearing Co. which represents radical departures from the features of present-day design in that it embodies

roller bearings for all axle journals. It is being loaned to some of the principal railroads of the country for a prolonged test period and is expected to demonstrate the feasibility of roller bearings for locomotives in either passenger or freight service.

In order to meet the maximum speed of 85 miles an hour, specified by the Timken company, without exceeding the limitations of rail poundings, it was necessary to minimize the weight of reciprocating parts by the use of alloy steels. These have been incorporated into eccentric crank forgings and in forged axles and in the cast steel frames. There is also incorporated, in order to obtain further modern improvements in economy, a super heater, a steam dryer, a feed water heater and an automatic stoker.

It is claimed that the use of roller bearings reduces the starting friction to 5 per cent of that of the old type bearing, and it is expected that the new locomotive will be able to start a train of 450 tons greater weight than would be possible with a locomotive having plain bearings and equal tractive force and to maintain its motion with considerable power economy.

By-Product Coke Output in July Lowest Since 1927

WASHINGTON, Aug. 29.—The average daily production of 121,627 tons of coke at by-product plants in July was lowest since December, 1927, and the daily beehive coke output of 8254 tons was the lowest since the beginning of the monthly statistical record, according to the Bureau of Mines. Quoting THE IRON AGE, the bureau said the average daily production of 85,146 gross tons of pig iron was only slightly higher than the rate in November, 1924.

The output of by-product coke during July amounted to 3,770,426 tons, 183,420 tons less than in the preceding month. This decrease was borne entirely by the furnace plants. Stocks of coke at by-product plants continued to increase and reserves on hand at merchant plants showed a gain of 20.2 per cent above June. The estimated production of beehive coke was 214,600 tons.

In July, the New England Fuel & Transportation Co. increased its battery at Everett, Mass., by the addition of 82 Koppers ovens.

July Foundry Business Showed a Decrease

Production of gray iron castings during July was 63.6 per cent of normal, a decline of 10.1 per cent from June, according to the monthly report of the Gray Iron Institute, based on returns from 154 foundries. New business was 54.2 per cent of normal, a decrease of 4.2 per cent from the previous month, based on returns from 76 foundries.

Railroad Equipment

Lehigh & New England is expected to close this week against its inquiry for 300 box cars and five caboose cars.

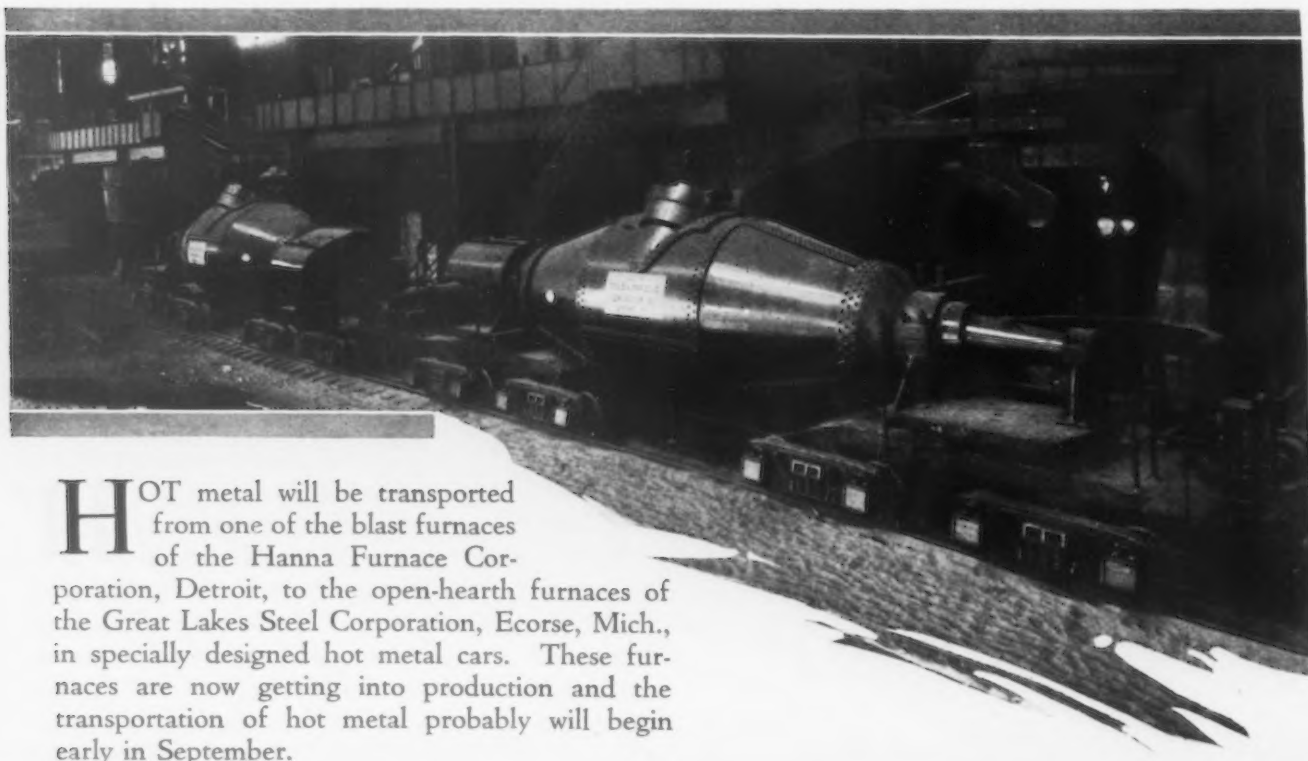
Tennessee Copper Co. is taking bids on 50 acid tank cars of 7000 gal. capacity each.

Carnegie Steel Co. is inquiring for 18 special 70-ton steel flat cars, 20 standard 70-ton steel flat cars and 30 flat-bottom 70-ton steel gondola cars.

Illinois Steel Co. has ordered 10 ingot cars from the American Car & Foundry Co. This is in addition to the 95 reported placed a week ago.

Erie has ordered two mail and express cars from the American Car & Foundry Co.

Jacob Becker & Sons will have 50 refrigerator cars repaired by Ryan Car Co.



HOT metal will be transported from one of the blast furnaces of the Hanna Furnace Corporation, Detroit, to the open-hearth furnaces of the Great Lakes Steel Corporation, Ecorse, Mich., in specially designed hot metal cars. These furnaces are now getting into production and the transportation of hot metal probably will begin early in September.

Automobile Industry Shows Little Recovery From July Low Point

DETROIT, Sept. 2.

WHEN official figures for August automobile production are made public in the near future, it is not likely that they will reveal much of a gain over July, which was the low mark for the year. Early in August it was thought that output would take a considerable forward step, but the comparative inactivity of some manufacturers more than offset the betterment reported by others. A few recent statements have intimated that August would equal or possibly exceed June in volume of cars turned out by automobile factories, but these hopes have been dispelled by disquieting stories of the poor situation in which some makers find themselves so far as sales of their products are concerned.

The Ford Motor Co. continues on a four-day week, but its steel plant has suspended operations for two weeks. In view of the fact that the company maintained uninterrupted production of steel during the three weeks when the remainder of the departments were shut down, it is not surprising that stocks have accumulated to such an extent that it is desirable to reduce them by means of a respite in the steel-making division. The Chevrolet Motor Co. is completing as rapidly as possible the work of various departments on the old models; meanwhile, it also is getting things in order for the 1931 cars. Preparatory to beginning actual work on the new models, the company is planning to close its foundry, axle and forging plants for two weeks in September. Moreover, it now is ready to place orders for steel tonnage to cover requirements on the first 20,000 of the new cars.

Buick pared its output the past week from some 850 cars a day to 550, or possibly 500. This sudden action resulted from the fact that dealers now have complete stocks, and should not be interpreted as indicating apathy on the part of the public. With industry still in the grip of economic depression it would be too much to expect Buick's retail sales to justify retention of the 850-a-day schedule. Nevertheless, it is thought that the drop to a lower production level came sooner than the company had anticipated. The Studebaker factory at South Bend, Ind., is fairly well engaged, but many other plants are doing little more than marking time until the introduction of new models stimulates activities. Cadillac-LaSalle has increased its rate of output

Motor car output made little, if any, gain in August over that of July.

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Operations of automobile plants and of steel mills in Detroit district still very erratic.

* * *

Automobile price reductions have helped to clear out unsold stocks of cars.

* * *

Steel quotations badly demoralized as mills continue to offer concessions for orders.

* * *

Narrowing of profits for automobile companies may bring renewed efforts to reduce production and material costs.

by sheet mills, coupled with the total suspension of rolling schedules recently, has cut down substantially the tonnage of sheet bars moving into this district.

Reo to Invade Fine Car Market

The Reo Motor Car Co. will announce its new line of cars in the early part of October. The factory at Lansing already is turning out cars for dealers, but secrecy is being maintained in regard to the design of the new models. It is known, however, that Reo is to bring out two distinct types of eights. One will be in the medium-price class, the other will represent an invasion of the fine car market. The streamline effect will be the latter's dominant feature from the standpoint of design. In the formation of its fenders, which embody a new principle, it is said that the Murray Corporation, which makes Reo bodies, has done some notable work hitherto never attempted by users of sheet steel. Reo has expended more than a million dollars this year in new equipment, about half of which has gone into machine tools.

Automobile Prices Continue Downward

THE downward trend in automobile prices is not confined to the low or medium-priced fields. Those companies catering to what might be termed the quality market also are finding it desirable to scale down their range of prices. This tendency is illustrated by the new Cadillac and LaSalle V-type eights, which will be put on display throughout the country on Sept. 6. They will be lower by \$180 to \$900 than the old models, the new LaSalle selling for \$2,195 to \$3,245, f.o.b. factory, and the Cadillac from \$2,695 to \$3,795.

That the clearance sale prices put on Oakland eights and Pontiac sixes have had the effect of moving stocks in dealers' hands is indicated by a statement issued by the factory announcing that sales during the 10-day period ended Aug. 20 were 70 per cent better than in the preceding 10 days. Whether Hudson-Essex has achieved a like success in its attempt to unload excessive stocks is not known.

While there is a distinct downward movement in automobile prices, people close to the industry are prone to dismiss the idea that recent developments are the forerunner of a price war. It is well known that most Gen-

several times since early August and now is assembling close to 200 cars a day five days a week. Packard is said to have turned out in the neighborhood of 2000 cars in August, with this pace carrying over into September. Chrysler, DeSoto and Dodge, as well as Hudson-Essex, are relatively quiet.

Steel Prices Demoralized

ORDERS for steel from automobile companies have been very lean, and in many cases steel makers have put the tempting bait of price concessions in front of users in an effort to augment already anemic order books. Sometimes this has brought out fresh business; on the other hand, there are a number of buyers who will not purchase material, even though the price might be unusually low, unless they actually need it. District steel offices freely admit that regular schedules have practically disappeared and that every transaction represents a barter between buyer and seller rather than an attempt on the part of steel companies to maintain a firm position.

One sheet mill in this district remains closed for another week; another mill resumed operations the past week after a seven-day shutdown, but ability to sustain even part-time activities is dependent upon bookings from day to day. Full-finished sheet mills, of course, are suffering more than those engaged in producing common grades. The low rate of output

eral Motors units frown upon destructive price competition which assumes the form of successive cuts by companies in the same field, and it is not considered likely that Ford would welcome a price fight. Both Ford and Chevrolet pass along to the public the benefits of production economies as soon as possible, but they have sought to avoid a real clash in prices. Ever since output of the model A Ford reached formidable proportions, Chevrolet has striven to offer a bigger, heavier car at a price above that of the Ford. In recent weeks the injection of the midget cars into the American industry has further intensified competition, but Detroit finds it hard to take the newcomers seriously.

The iron and steel industry dislikes to see the margin of automobile profits cut too drastically, because it means that increased attention will be paid to production economies. This, in turn, will be felt in the pressure which automobile companies will exert to secure their steel requirements at the greatest possible price concessions. In other words, makers of iron and steel having a considerable outlet for tonnage in the automobile industry may as well become reconciled to the fact that they must face a period when price will be emphasized more than ever before. If pressure was put on them in the days when automobile profits bulged, it is a foregone conclusion that it will be doubled when every price advantage has an important bearing on production costs and consequently on dividends to stockholders.

New England Steel Rates Protested

WASHINGTON, Sept. 2. — The Bangor & Aroostook Railroad has petitioned the Interstate Commerce Commission to reopen its order in the general iron and steel rate case fixing rates throughout Official Classification territory with a 10 per cent higher level in New England than the basic scale prescribed. The road wants authority to establish rates for its line on iron and steel that will add for its mileage haul approximately 30 per cent of the first class arbitraries. This basis was prescribed by the Public Utilities Commission of Maine in connection with the fixing of first class rates provided for by the national commission in the Eastern class rate case. The B. & A. proposes a minimum arbitrary of 1c. for iron and steel.

Great Lakes Steel to Operate Its Strip Mill

The Great Lakes Steel Corporation, Detroit, will begin the operation of its new hot strip mill at Ecorse, Mich., this week. The mill will roll strip 16 gage and heavier in widths up to 33 in. It consists of Mesta four-high finishing mills and equipment for pickling, oiling and normalizing.

Reduced Output of Aircraft

Capacity Is About Double Present Production Rate—Great Progress Since 1926 in Design and Construction

WASHINGTON, Aug. 29.—Day after day, air transportation is becoming more firmly established in industry and commerce, according to a report on the progress of the commercial aviation industry, made to President Hoover by Col. Clarence M. Young, assistant secretary for aeronautics, Department of Commerce. Colonel Young pointed out that, while the economics of air transportation are yet to be adjusted, the fact remains that air transport organizations, which are rendering a service clearly advantageous in time over other means of travel, or which advantageously augment surface transportation, are becoming an indispensable factor in the general transportation scheme of the country.

"About two years ago a substantial portion of the large number of manufacturers of aircraft were made up of small local companies," the report said. "Undoubtedly, they were hastily formed for the purpose of supplying a demand for conventional type aircraft which then seemed apparent. Presumably, they gave secondary thought to the economic phase of design, production and distribution, which, together with their slight preparations and limited financial background, made it obvious that they would not weather any unfavorable change in conditions or circumstances. "This is proving to be the case, but it is resulting in the manufacturing phase of the industry contracting itself into a smaller but highly specialized group, surrounded by the best engineering, production and marketing personnel obtainable today."

Last year, approximately 6000 planes were produced, of which about 650 were military, the report said. Reports for the first six months of 1930 show that 1325 aircraft were manufactured for civil use and 359 for military purposes.

Colonel Young said that this reduced production by no means indicates the capacity of the industry at the present time. By bringing back into action the qualified personnel it was forced to release due to the decrease in business, it was pointed out, the industry could produce annually more than 7000 planes, and this capacity could, of course, be progressively increased.

"At present, the manufacturers are paying strict attention to the needs and desires of an intelligent and discriminating aircraft market," the report said. "They are making every effort to design and produce aircraft which their experience and studies have indicated are required by such a market. At the same time they are projecting plans on new developments,

new designs and new features in an effort to keep in the van of public desire."

The greatest progress in design and construction has been made within the past four years, it was stated. This progress, the result of a large investment in engineering data and experience gained in manufacturing and production, was said to represent the foundation from which the future commercial aircraft must come.

According to the report there now are approximately 15,000 miles of airways equipped for night flying. During the current fiscal year 3000 additional miles of airways will be lighted. There are about 1650 airports and landing fields scattered over the country, and 6786 licensed planes and 2086 unlicensed planes are on the records of the Aeronautics Branch.

Ask Lower Rates on Scrap To Pittsburgh District

WASHINGTON, Sept. 2.—Reduced freight rates on iron and steel scrap from certain Pennsylvania points to a basis of 70 per cent of the basic scale of distance rates in the manufactured iron and steel rate structure in Official Classification territory has been asked in a complaint filed with the Interstate Commerce Commission by the Institute of Scrap Iron and Steel, Michlovitz & Co., Harrisburg, Pa., and Isaac Miller Sons, Lancaster, Pa. The basis sought is the same as that ordered by the commission on scrap in the case of the Newport News Shipbuilding & Dry Dock Co., affecting rates between various points in Maryland, Delaware and Pennsylvania.

The complaint especially asked for rates on the 70 per cent basis from six origin points in Pennsylvania to the Pittsburgh district. The rate from these points to Pittsburgh, Midland and Monessen is \$5 a gross ton except from Lancaster and Lebanon, from which points the rate is \$5.10.

The rates asked are:

FROM	Pittsburgh	TO Midland	Monessen
Carlisle	\$3.92	\$4.26	\$3.81
Chambersburg ..	3.81	4.03	3.58
Harrisburg	3.81	4.14	3.81
Lancaster	4.03	4.37	4.14
Lebanon	4.03	4.26	4.03
Mechanicsville ..	4.03	4.26	3.92

Refined Steel Products Co. has changed its name to the Densite Corporation of America, Clark Building, Pittsburgh.

August Iron Output Declines

Daily Estimated Rate Down 4.3 Per Cent to 81,500 Tons—
Net Loss of Six Furnaces

DATA, gathered by wire on Tuesday, Sept. 2, from all active furnaces except one (output about 19,000 tons per month) show that the August production of pig iron, estimated by the companies in some cases, fell off considerably from July.

Estimated daily output in August was 81,500 gross tons as compared with 85,146 tons per day in July. This is a loss of 3646 tons in the daily rate or 4.3 per cent. The August estimated total for 31 days was 2,526,500 tons. This contrasts with 2,639,537 tons for the 31 days in July.

The table below gives the totals by districts for the last four months. The August daily rate is the smallest since October, 1924, when it was 79,907 tons. The most recent smaller output for August was the 60,875 tons per day in 1924.

Preliminary returns indicate that three furnaces were blown in and nine shut down—a net loss of six. In July the net loss was 16 stacks. On Sept. 1 there were 138 furnaces operating.

Complete data will be published in THE IRON AGE for Sept. 11.

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York and Mass.	156,973	162,328	215,442	215,704
Lehigh Valley	70,494	67,348	69,996	76,699
Schuylkill Valley	31,526	44,312	37,911	46,752
Lower Susq. and Lebanon Valley	18,579	19,426	22,503	42,915
Pittsburgh district	581,528	605,414	647,557	677,743
Shenango Valley	68,735	70,917	67,861	72,570
Western Pennsylvania	65,850	61,886	75,140	106,875
Maryland, Va. and Ky.	98,214	93,697	97,980	112,233
Wheeling district	145,330	142,492	149,070	168,365
Mahoning Valley	225,173	246,176	255,071	280,193
Central and Northern Ohio	227,826	258,435	276,722	284,849
Southern Ohio	44,103	47,076	48,279	48,264
Illinois and Indiana	486,412	507,822	620,941	719,328
Mich., Minn., Mo., Wis., Colo and Utah	114,057	119,769	125,598	144,381
Alabama	191,700	192,002	222,330	234,289
Tennessee	.....	437	1,728	1,600
Total	2,526,500	2,639,537	2,934,129	3,332,760

Report Defines Reasonable Rates on Rails

WASHINGTON, Sept. 2.—In a report made public last Wednesday, the Interstate Commerce Commission said that a reasonable and non-prejudicial basis for rate on rails and crossties, in carloads, from Newark, Ohio, and Huntington, W. Va., to Central and Eastern Trunk Line territories would be 90 per cent of the rates on general iron and steel articles applying in Official Classification territory.

Specific reference was made to the basic table prescribed in the decision covering investigation of iron and steel rates in the latter territory in connection with the so-called Hoch-Smith resolution.

The railroads had proposed rates from Newark and Huntington to certain destinations in West Virginia, Virginia, and Maryland on a basis of 78 per cent of the sixth class rates. The proposed rates would have applied principally to West Virginia points, and would have resulted for

the most part in increases, although reductions would have predominated from Newark. To a number of destinations no change was proposed. The tariffs were protested by the West Virginia Rail Co., Huntington. Light rails are made at both Newark and Huntington. The commission ordered cancellation of the schedules without prejudice to the filing of rates on the basis of 90 per cent of general iron and steel rates.

Demand for Steel Boilers Off Slightly in July

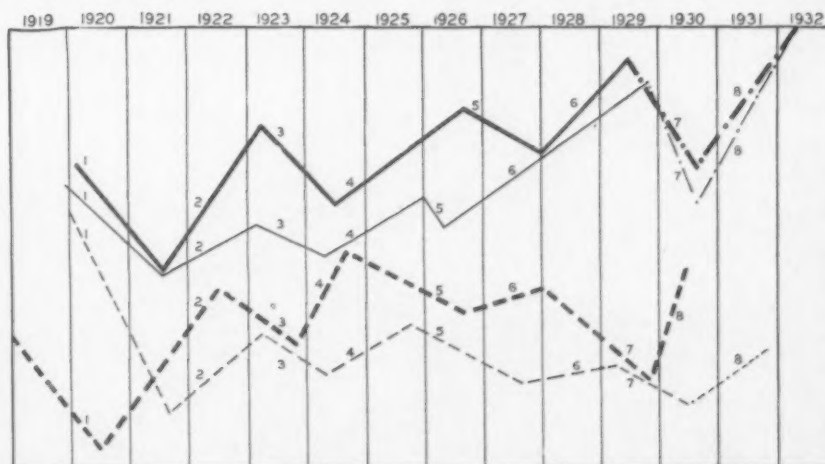
WASHINGTON, Aug. 29.—Orders for steel boilers in July totaled 1309 units, with 1,410,096 sq. ft., against 1360, with 1,588,553 sq. ft., in June, according to reports received by the Department of Commerce from 81 manufacturers. Orders in the first seven months of 1930 totaled 7761 boilers, with 8,682,854 sq. ft., compared with 10,777, with 11,818,801 sq. ft., in the corresponding period of 1929.

Study Ore Problems

Clyde E. Williams, assistant director, and Byron M. Bird, concentration engineer, of Battelle Memorial Institute, Columbus, Ohio, have returned from a month's trip through the iron mines of the Lake Superior district, where they made a detailed study of production and treatment methods employed by the iron ore producing industry in that section. They also visited the copper mining district of northern Michigan, the Michigan School of Mines and Technology at Houghton, Mich., the Minnesota Mines Experiment Station at the University of Minnesota, the station of the United States Bureau of Mines at Minneapolis, and the research laboratories of the leading mining companies, where they made a survey of their research methods and equipment. The trip was made in connection with a project conducted at the institute, devoted to the study of the beneficiation of iron ores.

Money Rates Forecast Business Upturn

MONEY rates forecast an early upturn in the volume of industrial production, according to a chart prepared by Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass. The heavy dotted line represents commercial paper rates, New York (reversed). The heavy solid line is the volume of industrial production (Federal Reserve Bulletin). The light dotted line is wholesale commodity prices (Guaranty Survey). The light solid line is industrial stock prices (Annalist). Estimated movements for parts of the lines forecasted are indicated by dashes and dots. The lines in the chart are comparable only for direction and duration of trend. Minor fluctuations are omitted.



New Cr-Mo-Al Alloy Being Produced

Another alloy has been added to the rapidly growing list of new combinations. The Ruselite Corporation, Milwaukee, has recently started production of a new chromium-molybdenum-aluminum alloy. Because of the patent situation the exact composition cannot now be made public, but the company states that this alloy, when die-cast, shows a much greater tensile strength and larger elongation than the ordinary aluminum alloy. A tensile strength as high as 30,000 lb. per sq. in. with an elongation of between 5 and 6 per cent in 2 in. is reported.

Another peculiarity of the metal, according to the company, is that when rolled into sheets it is in a class with the duralumin alloys, but that it does not suffer any loss in tensile strength when annealed. In other words, it has a higher tensile strength when hard with an elongation of 1 to 2 per cent, but when it is annealed the elongation increases to over 20 per cent with a drop in tensile strength of not more than about 1000 lb.

It is stated that when the material is polished it closely resembles chromium plating and offers a large resistance to corrosion in salt spray tests and in various mild acids.

To Design Russian Steel Plant on Dnieper

The Dnieprostal Metallurgical Works of Russia has awarded a contract for the designing of two open-hearth steel plants, consisting of nine 250-ton stationary furnaces for one plant and six 250-ton tilting furnaces for another plant, to the S. R. Smythe Co., Inc., Oliver Building, Pittsburgh. The plants are to be located on the Dnieper River a short distance north of the Black Sea. The Smythe company is also to act as consulting engineer on the general arrangement of the entire steel plant, which will include six 1000-ton blast furnaces. Finishing capacity will embrace facilities for the production of approximately 1,000,000 tons of hot-rolled products. The second plant, to have an annual capacity of approximately 500,000 tons, will make alloy and tool steels principally.

Canada's Pig Iron and Steel Output at Low

Production of pig iron in Canada in July, at 64,676 gross tons, was the lowest for any month of the year. For the seven months ended with July, production of pig iron totaled 515,862 tons, a decline of 17 per cent from the 618,343 tons made during the corresponding period last year.

Production of ferroalloys amounted to 3334 tons, a decline of 70 per cent from the record established in the previous month at 11,059 tons. For

the seven months, output totaled 48,294 tons.

Output of steel ingots and direct steel castings for July, at 68,424 tons, was the lowest tonnage reported since October, 1927, and was 28 per cent less than the 95,321 tons produced in June and 47 per cent under the 129,827 tons made in July, 1929. For the seven months ended July 31, the production of steel ingots and direct steel castings at 697,417 tons, was 20 per cent less than in the corresponding period last year, when 868,669 tons was the total.

New Freight Cars Placed in Service Gain This Year

WASHINGTON, Aug. 29.—Class I railroads of the United States during the first seven months of 1930 placed 55,660 new freight cars in service, against 42,552 in the corresponding period of last year, an increase of 13,108, according to the Car Service Division of the American Railway Association. Of the new freight cars installed in the 1930 period, 28,616 were box cars, an increase of 8069, and 21,463 were coal cars, an increase of 14,475. Other installations included 3177 flat cars, 1615 refrigerator cars, 488 stock cars and 301 other miscellaneous cars. On Aug. 1 the railroads had 19,627 freight cars on order, compared with 36,335 cars on the corresponding date of last year and 14,704 on Aug. 1, 1928.

The railroads also placed in service in the first seven months of the present year 484 new locomotives, compared with 371 in the corresponding period of last year. New locomotives on order on Aug. 1 of the present year totaled 296, against 410 on the same date of last year.

Pipe Tariffs to Texas Are Suspended Until March

WASHINGTON, Aug. 29.—The Interstate Commerce Commission yesterday announced suspension from Aug. 25, 1930, until March 25, 1931, of the operation of tariff schedules which propose changes in rates on wrought iron or steel pipe, in carloads, from certain Atlantic ports to destinations in Texas. By use of the proposed basis for constructing rates, the rates would be reduced from various interior Eastern producing points by way of rail-water-rail routes.

Illustrative of the proposed tariffs are those which would reduce the rate from Chester, Pa., to Dallas, Tex., to 62½c. per 100 lb., from the existing rate of 74c., and the rate of 74c. from Reading, Pa., to Dallas would be reduced to 67½c.

Accidents at the plants of the American Rolling Mill Co. have been reduced 72 per cent in the first half of this year, compared with the first half of 1929. The company attributes this record to the foreman-manager and job training programs carried on.

Steel Plate Fabricators Are Considering Association

A meeting of representatives of the steel plate fabricating industry was held at the Engineers' Club, New York, recently, for the purpose of considering a national organization to promote and protect the interests of the industry.

Charles F. Abbott, executive director of the American Institute of Steel Construction, Inc., who was the principal speaker, reviewed the work of his organization.

It was voted that the chairman appoint a committee of five to draft a definite plan of organization and to arrange for another meeting to be held early in the fall. J. W. Poushey, 33 West Forty-Second Street, New York, is secretary.

Chicago Iron and Steel Market

(Concluded from page 646)

and are more actively separating and preparing grades which they are not anxious to offer at this time.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel.....	12.00 to 12.25
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.25 to 10.75
Drop forge flashings.....	8.50 to 9.00
No. 1 busheling.....	9.50 to 10.00
Forg'd cast and r'l'd steel carwheels.....	15.00 to 15.50
Railroad tires, charg. box size.....	15.50 to 16.00
Railroad leaf springs cut apart.....	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs.....	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings.....	11.25 to 11.75
Low phos. punchings.....	13.00 to 13.50
Low phos. plates, 12 in. and under.....	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings.....	9.50 to 10.00
Cast iron borings.....	7.75 to 8.25
Short shoveling turnings..	7.75 to 8.25
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.50 to 15.00
Cupola Grades:	
Steel rails, less than 3 ft..	13.75 to 14.25
Steel rails, less than 2 ft..	14.50 to 15.00
Angle bars, steel.....	13.25 to 13.75
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	12.50 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.	12.00 to 12.50
Iron arch bars and transoms.....	13.50 to 14.00
Iron car axles.....	21.50 to 22.00
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought...	9.75 to 10.25
No. 2 railroad wrought...	11.00 to 11.50
No. 1 busheling.....	7.50 to 8.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast.....	12.00 to 12.50
No. 1 railroad cast.....	10.00 to 10.50
No. 1 agricultural cast....	9.50 to 10.00
Stove plate.....	9.50 to 10.00
Grate bars.....	8.50 to 9.00
Brake shoes.....	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PERSONALS

JOHN S. OURSLER, since April, 1928, vice-president of the Carnegie Steel Co., Pittsburgh, has tendered his resignation effective Oct. 1, because of ill health. Before becoming vice-president, he had been general superintendent of the Homestead works since the abandonment by the Government of the project to construct an ordnance plant at Neville Island during the war, and since that time has carried through a large reconstruction program covering a period of nearly five years. Mr. Oursler was first employed by the Spearman Iron Co., Sharpsville, Pa. Soon afterward he went to the Carnegie company as a foreman at Edith furnace, North Side, Pittsburgh. Successively he became superintendent Mingo furnaces, Ohio Works furnaces, New Castle furnaces, assistant general superintendent New Castle works, general superintendent New Castle works, and general superintendent New Castle district, which included works at Farrell and Sharon, Pa. He held this position until 1918, when he was selected to supervise the building of the Neville Island ordnance plant.



J. S. Oursler



H. D. Westfall

JAMES A. HENRY has been appointed vice-president in charge of sales for the Weirton Steel Co., Weirton, W. Va., succeeding H. D. WESTFALL, who has resigned because of ill health. Mr. Henry is succeeded as assistant vice-president in charge of sales by L. D. BRUECKEL, recently manager of strip sales for the Weirton company. Mr. Westfall went with the Weirton company five years ago after having been identified with the Wheeling Steel Corporation for 22 years. He entered the steel industry in 1895 with the old New Philadelphia Iron & Steel Co., New Philadelphia, Ohio, and was assistant general manager of sales when that company was absorbed by the American Sheet Steel Co. in 1900. After three years in the New York office of the American company, he went with the LaBelle Iron Works, Steubenville, Ohio, and served that company successively as manager of sales, secretary and vice-president. When the LaBelle company was merged with the Wheeling Sheet & Iron Co. and the Whitaker-Glessner Co. to form the Wheeling Steel Corporation in 1920, Mr. Westfall continued in a sales capacity and was general sales manager when he left the Wheeling company in 1925. James A. Henry has been active in the sale of flat-rolled steel products for a number of years, particularly in the Detroit territory. He went with the Weirton company in 1926 from the Columbia Steel Co., Butler, Pa., which he had served for the previous year as Detroit district manager.

Although his headquarters have been at Weirton since he joined that company, he has devoted considerable attention to the Detroit district. Before going with the Columbia company, Mr. Henry had been Detroit district manager of sales for the Wheeling Steel Corporation. L. D. Brueckel has devoted the greater part of his active business career to the Weirton company and its predecessors. After working for a time for the American Sheet & Tin Plate Co., Pittsburgh, he became associated with the old Pope Tin Plate Co., Clarksburg, W. Va., and served for a time as New York district manager. When the company became a part of the Weirton Steel Co., he continued the association and has served the organization in various sales capacities.

OSCAR C. KREIS has been appointed consulting engineer for the Studebaker Corporation, South Bend, Ind. For many years he was in the experi-

mental engineering division of the Packard Motor Car Co. and for the last 14 years was research and development engineer for the Continental Motors Corporation.

ERNEST BAXTER, who has been made a vice-president of the Sheffield Steel Corporation, Kansas City, has been placed in charge of a sales office this company has opened in the Straus Building, Chicago.

DON J. KIRK, of the general sales office of the Greer Steel Co., Dover, Ohio, has been made district representative in charge of the Detroit office of the company.

FREDERICK H. LOW, who has been connected with plant engineering development for the past 17 years, has joined the King Refractories Co., Buffalo, as secretary and general manager.

RAY C. CROUCH, heretofore works manager of the Birmingham plant of the A. G. Reeves Steel Construction Co., has been made manager of the Alliance, Ohio, plant of the company.

DANIEL SATHER, who has completed 25 years of continuous service with the Watson-Stillman Co., New York, was presented with a watch to mark the event at the company's annual outing.

WILLIAM A. DAYTON, who was long associated with Dickerson, Van Dusen & Co., tin plate dealers in New York, has been appointed New England representative of C. S. Davis & Co., Inc., with headquarters in the Bush Terminal, Brooklyn.

E. W. ESSLINGER, of the Union Gas & Electric Co., Cincinnati, is to address the Cincinnati chapter of the American Society for Steel Treating, Sept. 4, on "Influence of Furnace Atmospheres on Correct Heat Treatment Practice."

RICHARD FERGUSON, president, Ferguson Gear Co., Gastonia, N. C., has been elected president of the Turner Mfg. Co., Statesville, N. C., manufacturer of agricultural machinery.

Mechanical stokers to the number of 150 with 37,761 hp. were sold in July, against 151 with 47,803 hp. in June, according to reports received by the Department of Commerce from the 11 leading manufacturers.

Advises British Steel Makers

J. Leonard Replogle Suggests Scrapping of Blast Furnaces and Building 3,000,000-Ton Steel Plant

THE Chicago Tribune obtained access to a report prepared by J. Leonard Replogle, steel administrator for the United States Government during the war, for a group of British steel makers. The cable dispatch says:

"Annexed to his report is a detailed scheme prepared by his technical engineers in America for the construction of a mammoth model steel plant in England at a cost of about \$300,000,000 and with a capacity of about 3,000,000 tons of steel a year."

Six Recommendations

The summary of the report offers six recommendations, as follows:

1. Practically all English blast furnaces are obsolete and should be scrapped and modern furnaces of 1000 tons per day capacity should be installed.

2. The largest type Koppers or other by-product coke ovens with complete tar, gas, ammonia and other by-product recovery plants are an absolute necessity. A domestic market for any surplus gas should be available and recovery of these by-products should mean a saving of approximately \$4 a ton of coke produced, as compared to the old beehive ovens without any by-product recoveries.

3. As about 2,500,000 tons, or 60 per cent of Britain's imports, is in pig iron, blooms, billets, slabs, sheet and tin plate bars, and wire rods, it is obvious that these semi-finished products should receive first attention before following with plates, shapes and bars, which account for 1,200,000 tons, or 30 per cent of imports. This policy should result in least disturbance to existing finishing mills.

4. The main plant, if possible, should be located at seaboard with deep-water harbor and good fresh-water supply and preferably near the larger steel-consuming districts of England or Wales, although this is secondary to the deep harbor advantages of raw material assembly and export trade.

National Defense a Factor

5. An important consideration in the increase of steel output of Britain is the factor of national defense. Germany and Austria entered the World War with an annual steel production of more than 21,000,000 tons, as compared to a combined total of less than 16,000,000 tons for Britain, France, Belgium and Italy. Had Germany been successful in preventing the enormous tonnages of munitions from America reaching the battle line her weight of metal might possibly have been a determining factor in her favor.

6. As civilization advances, the per

capita consumption of steel increases in all countries. In the United States it has increased from 353 lb. per capita in 1908 to 959 lb. in 1929. The world's per capita consumption should continue to increase as in the past, so the future of the industry is on a sound basis. Britain should be prepared to participate to a greater extent than is possible under existing conditions, and with the enormous cost reductions which would result from adoption of the above plan, their collateral interests, such as automobile manufacture, shipbuilding, etc., would be expected to expand, many thousands of workers now idle would be employed, a high degree of prosperity for England would ensue and the return from the necessarily large investment would be extremely satisfactory.

Comparison with United States

The report quotes figures compiled by the National Industrial Conference Board on what has been accomplished in American blast furnace operation by intensive mechanization and shows that comparing the years 1913 and 1928 the American workers' hours have been reduced 14.4 per cent, wages increased 96 per cent and average output of pig iron per man per hour of labor increased from 0.141 ton gross to 0.296 ton gross, an increase of 110 per cent. Average weekly earnings per man in the iron and steel industry in the United States in September, 1928, were \$35.53, whereas in Britain they amounted to only \$14.60.

Spring Manufacturers Form Research Bureau

Following three preliminary meetings which were held at Toledo, Ohio, Chicago and New York, several mechanical spring manufacturers met recently at Toledo and organized the Spring Research Bureau, the object of which is to establish cordial personal relations between manufacturers of mechanical springs; to devise ways and means to promote a feeling of good will between manufacturers and their customers; the mutual study of cost accounting systems and the costs of manufacture; to improve and develop commercial methods in the manufacturing and marketing of mechanical springs; to obtain and diffuse information on general trade matters, especially operation and sales problems; to cooperate with all Government agencies and departments and other organizations in standardization and association work. Thirty-one different plants

have been represented at the four meetings.

Malcolm Baird, 232 Delaware Avenue, Buffalo, is secretary of the organization.

"Adnic" Said to Resist Heat and Corrosion

A new corrosion and heat-resisting alloy called "Adnic" has been recently developed by the Scovill Mfg. Co., Waterbury, Conn. It contains approximately 70 per cent copper, 29 per cent nickel and 1 per cent tin. It is said to be particularly adapted for laundry machinery, mine and paper pulp screen, and condenser tubes operating at high temperature, and it is said also that it resists salt water and organic chlorides and sulphides. It can be drawn, stamped and spun.

A. M. Byers Co. Shuts Down Its Girard, Ohio, Mill

The A. M. Byers Co., Pittsburgh, on Aug. 15 closed its hand puddle mill at Girard, Ohio. The move prepares for consolidation of the company's manufacturing operations at a new mill on the Ohio River near Ambridge, Pa., which will have an ultimate capacity of 45,000 tons of wrought iron a month, compared with the Girard plant's 5000-ton monthly capacity. The Girard plant, built in 1908, consisted of 88 puddle furnaces and a plate mill. A blast furnace was dismantled in 1929.

Obituary

WILLIAM GUTENKUNST, pioneer Milwaukee manufacturer, founder and president of the Milwaukee Hay Tool Co., and also president of the Milwaukee Malleable & Gray Iron Co., died Aug. 23, aged 80 years. He was one of the best known inventors in the farm utility field, having originated new designs of hay forks, corn huskers, fodder cutters, etc.

WILLIAM LINDSAY WOTHERSPOON, formerly consulting engineer of the International Nickel Co., died at Phoenix, Ariz., Aug. 20, aged 51 years. Born in England, where he received his early technical training, he went to South Africa in 1901, where he was a member of the consulting staff of the Central Mining & Investment Corporation of Johannesburg. In 1912, after spending a short time at the mines of the International Nickel Co. in Canada, Mr. Wotherspoon was sent to New York, where he had been for many years in charge of engineering and construction until his illness several years ago. He was responsible for the construction of the company's Huntington, West Va., plant.

Further Improvement Seen

Gains in Machine Tool Buying Are Slight, But Prospective Buyers Take More Interest

FURTHER slight improvement in machine tool sales and inquiries developed in the last week of August, especially in the New York and Chicago districts. In a number of instances August sales exceeded those of July.

The gain in orders, while not important, is accompanied by a revival of interest among prospective buyers, as evidenced by telephone calls and letters to machine tool sellers from companies which have been "out of the market" during the summer. A few orders have been placed for machines, on which quotations were made three or four months ago.

Once business psychology changes to a feeling of confidence, orders for machine tools might improve rather quickly, as a good deal of pending business was carried over from the spring, when prices were quoted on equipment that has not yet been bought. Most of such equipment is wanted by the prospective purchasers,

but buying was postponed because of the unsatisfactory business outlook.

The American Locomotive Co., having completed fairly large purchases for its subsidiary, the McIntosh & Seymour Corporation, will buy in about two weeks for its own shops at Schenectady, N. Y., in which obsolete equipment will be replaced by modern tools between now and the first of the year, when the railroads presumably will be in the market again for new motive power. It is said that the locomotive company's purchases will be quite large.

At Chicago, the Majestic Household Utilities Corporation, a Grigsby-Grunow affiliate, bought about \$10,000 worth of drilling equipment and several miscellaneous items to round out its large purchases of a few months ago for the manufacture of electric refrigerators.

The Amtorg Trading Corporation, New York, continues to place orders for shipment to Russia.

New York

NEW YORK, Sept. 2.—Further evidence of more interest in machine tool purchases appeared during the last week of August. The volume of business was not large, but it was very good when compared with the inactivity of previous weeks of the summer. Machine tool sellers received many telephone calls from prospective buyers who have been "out of the market" all summer. In a few instances, orders were received for tools on which quotations had been given three or four months ago. The American Locomotive Co. has bought quite a number of tools for its subsidiary, the McIntosh & Seymour Corporation, Auburn, N. Y., and will place orders within about two weeks for its own shops at Schenectady, N. Y. It is said that the company has decided upon getting rid of all obsolete equipment, and that its purchases between now and the end of the year will be very large. Deliveries will not be required until about Jan. 1, 1931, by which time, it is expected, the railroads may again be in the market for new motive power.

Cornell & Underhill, Inc., 311 Spring Street, New York, manufacturer of cast iron pipe, has filed plans for a new one-

story foundry and plant at Hoboken, N. J., to cost over \$60,000 with equipment. Present works will be removed to new location.

Air Reduction Co., 60 East Forty-second Street, New York, manufacturer of industrial oxygen, welding apparatus, etc., has acquired plant and business of Superior Acetylene Co., St. Louis, and will consolidate. It is proposed to continue plant at present location and expand capacity.

Board of Education, Tuxedo Park, N. Y., plans installation of manual training equipment in new three-story George F. Baker high and grade school, to cost over \$400,000, for which bids have been asked on general contract. Gullbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

Vacuum Oil Co., 61 Broadway, New York, has purchased Wadham Oil Co., Milwaukee, operating an oil storage and distributing system, and will consolidate. It is proposed to carry out an expansion in territory noted, including additional storage and distributing plants.

Behrer & Co., 77 Beekman Street, New York, plumbing equipment and supplies, are considering a two-story storage and distributing plant, 110 x 200 ft., with pipe and fitting department and other facilities, to cost over \$80,000 with equipment. J. E. Nitchie, World Building, is architect.

Atlantic Iron Works, Inc., Astoria, L. I.,

has been formed with a capital of 200 shares of stock, no par value, to take over and expand company of same name with local plant at 28-20 Forty-first Street. New company is headed by Andrew J. and John L. Burger.

Carbide & Carbon Chemicals Corporation, 30 East Forty-second Street, New York, a subsidiary of Union Carbide & Carbon Corporation, same address, has asked bids on general contract for a one-story storage and distributing plant at Hillside, N. J., to cost over \$35,000 with equipment. Company is contemplating a plant for production of pyrofax gas at this location. Company engineering department is in charge.

Durant Motors, Inc., 250 West Fifty-seventh Street, New York, main plant at Lansing, Mich., has contracted with American Mathis, Inc., New York, to manufacture 100,000 Mathis automobiles, midsize type, delivery to begin in December. Last noted company was recently organized as an American interest of E. E. C. Mathis, Ltd., Strasbourg, France, manufacturer of automobiles, and American car will duplicate model now being produced there. Durant company will carry out initial production, including parts and assembling, at Lansing works. Oakland, Cal., plant also will be used for similar manufacture for Pacific Coast trade. W. C. Durant is president of Durant company, following recent reorganization; E. E. C. Mathis is chairman of board of American Mathis, Inc.

Hubeny Brothers, Inc., 615 East First Avenue, Roselle, N. J., machinist, has plans for a one-story addition to machine shop, to cost close to \$30,000 with equipment. W. L. Finne, 1201 East Grand Street, Elizabeth, N. J., is architect.

Board of City Commissioners, City Hall, Jersey City, N. J., is contemplating immediate call for bids on general contract for two additions to power plant at Baldwin and Montgomery Streets, to cost over \$80,000 with equipment. John T. Rowland, 30 Journal Square, is architect.

Oil Products, Inc., Singac, N. J., producer of base oils for extracts, etc., plans rebuilding part of plant recently destroyed by fire, with loss over \$50,000 with equipment.

Industrial Welded Alloys, Inc., Newark, has established a new plant at 8 Lister Avenue for production of special metal alloys for welding. Company will operate as a unit of Industrial Alloy Products Corporation, 230 Park Avenue, New York.

Board of Education, Paterson, N. J., will install a manual training department in new two-story and basement high school on Trenton Avenue to cost about \$335,000, for which plans have been filed. Lee & Hewitt, 152 Market Street, are architects.

Radio Corporation of America, Inc., Woolworth Building, New York, has engaged Clinton Mackenzie, 119 Broad Street, architect, to prepare plans for a radio transmitting and receiving plant on 700-acre tract recently acquired near New Brunswick, N. J., to cost over \$1,000,000 with power station, steel towers, shop and other units.

Goodman Electric Machinery Co. which specializes in rebuilt welding machinery and lifting magnets, has moved its office from 126 Green Street to 1060 Broad Street, Newark, N. J.

South Atlantic

BALTIMORE, Sept. 2.—Stone Straw Corporation, 30 O Street, N. E., Washington, manufacturer of straw tubes, etc., and Stone Paper Tube Co., same address, have superstructure under way for new five-story and basement plant, 90 x 125 ft., to cost \$160,000 with machinery. I. H. Harris, Washington, is architect.

Virginia Bridge & Iron Co., Roanoke, Va., has plans for a one story addition to branch plant at Memphis, Tenn., to cost over \$20,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, is asking bids until Sept. 23 for insulated cable, track bolts, wire, splice bars and other mechanical equipment.

Crown Cork & Seal Co., Baltimore, manufacturer of bottle-capping machinery, bottle caps, etc., has acquired patent rights for special rubber closures to be used with metal caps for sealing food containers, etc., and is planning equipment and facilities for production at Highlandtown plant, where all manufacture is now being concentrated.

E. J. Reynolds Tobacco Co., Winston-Salem, N. C., has plans for a two-story addition to power plant, 56 x 80 ft., to cost close to \$50,000 with equipment. J. E. Strrine & Co., 215 South Main Street, Greenville, S. C., are architects and engineers.

Chemical Warfare Service, Edgewood Arsenal, Md., will receive bids until Sept. 10 for 38,020 ft. of sheet brass, as per specifications.

Washington Suburban Sanitary Commission, Tower Building, Washington, has plans for a new main pumping station to replace present plant at Burnt Mills, to cost over \$300,000.

Southern Public Utilities Co., 426 Church Street, Charlotte, N. C., is contemplating installation of an artificial gas plant at Chester, S. C., to cost close to \$100,000 with machinery.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has begun construction of a three-story addition to automobile service, repair and garage building for company motor trucks and cars, to cost close to \$100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until Sept. 9 for one motor-driven radial drill, one universal cutter and tool grinder, and one motor-driven air compressor.

Philadelphia

PHILADELPHIA, Sept. 2. — South Branch Power Co., Philadelphia, has applied for permission to construct and operate a hydroelectric generating plant on South Branch of Potomac River and on Cacapon River in West Virginia, including four power dams to develop a capacity of 25,000 hp., to cost over \$1,000,000 with transmission system.

Carolina Sheet Metal Corporation, 3009 Chestnut Street, Philadelphia, has leased one-story building in course of construction at Forty-second and Sansom Streets, totaling 8000 sq. ft., floor space, and will occupy for new plant for increase in capacity.

Bendix Brake Service Co., 3914 North Broad Street, Philadelphia, automobile brakes and equipment, has leased property on Forty-second Street, totaling about 35,000 sq. ft. floor space for new branch works. Headquarters are at South Bend, Ind.

DeLaval Steam Turbine Co., North Clinton Avenue and Pennsylvania Railroad, Trenton, N. J., manufacturer of turbine engines, pumps, compressors and kindred power equipment, has superstructure under way for a one-story and basement addition, to cost about \$40,000 with equipment.

Board of Education, Greenwood, Del., is considering installation of manual training equipment in addition to high school, to cost over \$125,000, for which plans will be drawn by Guilbert & Betelle, 20 Branford Place, Newark, N. J., architects.

American Car & Foundry Co., Bloomsburg, Pa., is considering rebuilding part of local plant destroyed by fire Aug. 26, with loss reported over \$350,000 with equipment. Headquarters are at 30 Church Street, New York.

Receivers for Harrisburg Mfg. & Boiler Co., Harrisburg, Pa., have applied to Court for permission to dispose of plant and property of company at a private sale Sept. 23, to George W. Rely, Andrew S. Patterson and Alfred G. Eden, a committee representing holders of mortgage bonds of company, for a consideration of \$25,000. It is proposed to reorganize company and resume production at plant. William H. Earnest and Roy H. Stetler are receivers.

Hawber Mfg. Corporation, Philadelphia, care of Frank A. Moorshead, Commonwealth Trust Building, attorney, is being organized by local interests to establish a plant for manufacture of metal and fiber products.

Heinen Air Yacht Corporation, Atlantic City, N. J., recently organized by Captain Anton F. Heinen, 11 Seward Street, Toms River, N. J., and associates, has begun production at Atlantic City works and will specialize in small dirigible aircraft, with gas capacity averaging 40,000 cu. ft. and length of about 100 ft., including parts and assembling. Company will also operate an airport at same location under name of Heinen Airport, Inc., including hangars, repair shops and other field units.

Pittsburgh

PITTSBURGH, Sept. 2.—Business has been very quiet the past week, with practically no new inquiry and orders confined principally to single tools. No action has been taken on any of the larger industrial projects under consideration in this district and some plans are underway which depend entirely upon the trend of business after Labor Day. Steel companies are generally inclined to go ahead with expansion and betterment plans in times of industrial depression, but machine tool buyers as a whole are more conservative.

Jones & Laughlin Steel Corporation is expected to take action this month on considerable machinery and equipment which it is seeking for betterment programs at its South Side, Pittsburgh, and Alliquippa plants. An expansion program at Youngstown works of the Republic Steel Corporation has also been announced for early action.

Gulf Oil Co., Frick Annex, Pittsburgh, will take possession of properties of Paragon Refining Co., Cincinnati, on Sept. 12, including refinery at Toledo, Ohio. Plans are under way to triple capacity of latter plant to cost over \$2,000,000. Project will include construction of a pipe line from Texas oilfields to Pittsburgh, with

branch line for furnishing crude oil to Toledo plant.

General Electric Co., Erie, Pa., has extensions under way at local plant in Wesleyville district for manufacture of porcelain enameled boxes for refrigerators. H. R. L. Emmet is works manager.

Board of Education, Ariel Building, McKeesport, Pa., has plans for a trade and industrial school to cost over \$450,000 with equipment. C. R. Moffett, Masonic Temple Building, is architect.

Electro-Metallurgical Co., Boncar, W. Va., a subsidiary of Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has awarded general contract to H. B. Agsten & Sons, Belle, W. Va., for new plant units to cost over \$350,000 with equipment.

Board of County Commissioners, County-City Building, Pittsburgh, has authorized an additional appropriation of \$1,000,000 for work at municipal airport, now in course of construction in Mifflin Township, fund to be used for purchase of adjoining tract of 200 acres, new hangar, machine shop and equipment and other field structures. County department of public works, Norman F. Brown, director, is in charge.

Pennsylvania Electric Co., Johnstown, Pa., is acquiring additional utilities in connection with expansion program, including Lock Haven Gas & Coke Co., Lock Haven; Renovo Consolidated Gas Co., Renovo, and Jennertown Borough Somerset Public Service Co., Jennertown, and plans extensions in these districts, including transmission lines.

Detroit

DETROIT, Sept. 2.—Board of Public Works, Grand Haven, Mich., is planning extensions and improvements in municipal electric light and power plant to cost \$222,000, including installation of a Diesel engine-generating unit and auxiliary equipment.

Brunswick Radio Corporation, Muskegon, a subsidiary of Warner Brothers Pictures, Inc., 321 West Forty-fourth Street, New York, has taken bids on general contract for an addition to cost over \$300,000 with equipment.

Detroit Gray Iron Foundry Co., 6403 Wight Street, Detroit, has plans for a new two-story foundry, 115 x 170 ft., to cost about \$70,000 with equipment. Mildner & Eisen, Hammond Building, are architects.

Board of Water Commissioners, Detroit, will soon take bids for a new electric generating station and boiler plant, to cost about \$200,000 with equipment.

Detroit Yacht Harbor, Inc., Detroit, recently organized with capital of \$700,000 by Harold S. Baker, 1010 Lafayette Building, Courtney Johnson, 54 Muskoko Street, and associates, has acquired about 22 acres on Detroit River, near Waterworks Park, as a site for a new boat service and storage plant. Plans are under way for initial buildings, to include machine and repair shops, oil storage and distributing plant and other buildings. Entire project will cost over \$500,000 with equipment.

In connection with additions to plant at Saginaw, under way, Wilcox-Rich Corporation, General Motors Building, Detroit, manufacturer of valves and other automobile engine equipment, will carry out expansion, segregating its tappet and piston ring production and increasing output 40 per cent. Work will cost about \$150,000, with machinery. Company re-

INDUSTRIAL ACTIVITY

Prospects as Revealed by a Survey of Construction Projects

SOME \$25,000,000 in new projects requiring machinery and factory equipment appeared in the past week.

Power generation looms most important in all this, 15 separate developments calling for over \$4,350,000, mostly of public and public-utility ownership. Included are hydroelectric enterprises in Alaska and on the Potomac River. Closely allied are oil industry activities that promise to require a larger investment than the power plants, or \$7,150,000. One item is a \$2,000,000 Gulf Oil proposal to triple refining capacity at Toledo. Also there is a General Electric expansion of \$500,000 at Cleveland.

The automotive industry continues to exert its broad influence, with \$2,600,000 classified mostly as aviation. Three airports will take \$2,000,000, one-half for Pittsburgh. Three large garages of quasi-public character total \$400,000. An unusual project is a boat repair works, \$500,000, at De-

troit, comprising a colony of service buildings.

Vocational school construction also is conspicuous. Ten localities are listed for a total of \$2,250,000 for manual training facilities.

Food and allied industries bring \$4,000,000 of factory plans, including a \$2,000,000 Corn Products refinery at North Kansas City, a \$250,000 Pillsbury mill at Springfield, Ill., and a \$1,500,000 fertilizer plant in California.

Under a miscellaneous classification, totaling \$4,600,000, come \$1,550,000 for 26 plants comprehending machining operations to a greater or less extent, \$1,000,000 for radio transmission at New Brunswick, N. J., \$500,000 each for a du Pont cellophane plant at Old Hickory, Tenn., and a printing plant for the St. Louis *Post-Dispatch*, and smaller amounts for an antimony plant in Texas, an Electrometallurgical Corporation expansion in West Virginia and a factory for typewriter supplies at Cambridge, Mass.

cently reopened its plant at Marshall for production of valves for Ford, Willy's Overland and Hudson automobiles. This plant will also be developed for production of pump shafts, rivet sets, valve guides and kindred automotive specialties. Company is discontinuing production at Detroit works and will transfer all operations of that branch to Battle Creek plant.

New England

BOSTON, Sept. 2.—The local machine tool market was lifeless the past week, many dealers being closed from Friday until today. Little improvement is anticipated this week, but the trade feels that business will begin to pick up about the middle of the month. No new prospects have developed and activity is centered on old ones, many of which look encouraging.

Sales of small tools in August were ahead of July with most dealers, but slightly below those in August, 1929. Small tool manufacturers say that tool stocks of many shops are at low level. This and other factors make the outlook for the next few months comparatively bright.

Johnson Church & Co., 149 Broadway, New York, engineers have plans for a gas house project at Coventry and West Warwick, R. I., including pumps and other equipment, to cost \$75,000.

du Pont Viscoloid Co., Lancaster Street, Leominster, Mass., will soon take bids on an addition, to cost \$80,000 with equipment. Miscellaneous electrical equipment will be purchased.

Boston & Maine Railroad, Leachmere Square, East Cambridge, Mass., will build an auxiliary water supply for its Billerica car shops, which will include pumping equipment. This railroad will discontinue

its Springfield locomotive repair shops and will move all equipment to Greenfield, Mass.

Board of Education, Berlin, N. H., is considering manual training shops in three-story addition to junior high school to cost over \$125,000, for which general contract has been let to Loucks & Clarke Co., Wallingford, Conn.

Stamford Gas & Electric Co., Stamford, Conn., has awarded general contract to Turner Construction Co., 120 Broadway, New York, for a new three-story equipment storage and distributing plant, 80 x 112 ft., with repair facilities, and for one-story automobile service, repair and garage building adjoining, 63 x 194 ft., for company motor trucks and cars, to cost about \$135,000 with equipment.

F. S. Webster Co., 340 Congress Street, Boston, manufacturer of typewriter equipment and supplies, has awarded a general contract to Turner Construction Co., 178 Tremont Street, for a new four-story plant, 100 x 200 ft., at Cambridge, to cost about \$160,000 with equipment. Densmore, LeClear & Robbins, 31 St. James Avenue, Boston, are architects.

Independent Lock Co., Fitchburg, Mass., has arranged for increase in capital and plans expansion for manufacture of new lines of hardware specialties. Company recently acquired door-check manufacturing division of Worcester Taper Pin Co., Worcester, Mass., and has transferred operations to Fitchburg works, where complete line of air-controlled and liquid door checks, parts, etc., will be manufactured.

Boston Elevated Railway Co., 31 St. James Avenue, Boston, has plans for a one-story motor bus service, repair and garage building at Roxbury, for handling 56 cars at one time, to cost over \$130,000 with equipment.

Quincy Market Cold Storage & Warehouse Co., Boston, has awarded contract to Aberthaw Co., Boston, for power house, 70 x 77 ft., to cost \$100,000.

Cleveland

CLEVELAND, Sept. 2.—Machine tool sales and inquiry show no improvement. Orders are confined to small single machines and are few in number. Dealers report that the volume of August sales was practically the same as that in July. The Amtorg Trading Corporation purchased eight to 10 turret lathes from a Cleveland manufacturer the past week for delivery to several Russian plants. This company states that leaving out this foreign business its August sales showed a slight gain over July. A local machinery dealer with a Detroit office did more business in the latter city in August than in July, the total being increased by the sale of two boring mills. Operations of metal-working plants in this territory showed little if any improvement. Sentiment in the machinery trade is a little better and some increase in business is looked for this month.

General Electric Co., Schenectady, N. Y., through its subsidiary General Electric Realty Corporation, 120 Broadway, New York, has awarded general contract to Sam W. Emerson Co., 1836 Euclid Avenue, Cleveland, for two and three-story addition to Cleveland plant, primarily for storage and distribution, to cost over \$500,000 with equipment.

Garfield Tool & Die Co., Garfield, Ohio, has leased one-story factory, 60 x 454 ft., at East Palestine, Ohio, and will remove to new location. Plans to acquire building at Salem, Ohio, have been abandoned with East Palestine acquisition.

Cleveland Steel Products Co., 7300 Madison Avenue, Cleveland, manufacturer of oil burners, pumping machinery, etc., has plans for a one-story addition, 80 x 90 ft., to cost about \$45,000 with equipment. George S. Rider Co., Marshall Building, is architect and engineer.

Patterson Refractories Co., East Liverpool, Ohio, recently organized by R. L. Cawood, president, Patterson Foundry Co., and associates, has work under way on remodeling a factory for production of high temperature refractory products.

Buffalo

BUFFALO, Sept. 2. — Martin & Schwartz, Inc., 2651 Main Street, Buffalo, manufacturer of gasoline pumps and oil station equipment, has taken over plant formerly used by Automatic Transportation Co., 2933 Main Street, totaling about 60,000 sq. ft. floor space, or close to three times present works, and will remove to new location. Additional equipment will be installed.

William S. Elsele, 802 Tacoma Street, Buffalo, and associates have organized W. S. Elsele, Inc., and plan operation of local works for production of sheet metal goods. Harold Oспен, 221 Washington Highway, Snyder, N. Y., is interested in new company.

Covert Gear & Mfg. Corporation, Lockport, N. Y., has been chartered under Delaware laws with a capital of 300,000 shares of stock, no par value, to manufacture automobile gears, transmissions, etc. New company will take over and expand organization of same name with local plant on Grand Street.

International Business Machines Corporation, Endicott, N. Y., has superstructure under way on an addition totaling about 60,000 sq. ft. floor space, for increased capacity of time recording and tabulating machines, parts, etc., to cost over \$100,000 with equipment.

Cincinnati

CINCINNATI, Sept. 2.—Machine tool business in this district continues sluggish, with buyers showing no desire to close on quotations already received. Inquiries, however, continue in fair volume and in many instances have a more serious tone than heretofore this year. Production is averaging about 50 per cent of capacity, but no immediate prospect of improvement appears. One leading manufacturer has been closed for about a week and many others are welcoming the holiday to close for the week end.

State Department of Public Welfare, Columbus, Ohio, will soon take bids on general contract for a two story and basement power plant at Longview State Hospital, Cincinnati, to cost about \$240,000. Equipment will include boilers, stokers, pumping machinery, water softeners and auxiliary apparatus. T. R. Ridley, Ohio Hartman Building, Columbus, is architect. H. H. Griswold is director.

Forest Products Chemical Co., Peres Street, Memphis, Tenn., is considering an addition to refining plant for production of charcoal, etc., from hardwood, to cost over \$75,000 with equipment.

du Pont Cellophane Co., River Road, Buffalo, N. Y., a subsidiary of E. I. du Pont de Nemours & Co., Wilmington, Del., manufacturer of transparent wrapping materials, has work under way on second unit of new mill at Old Hickory, Tenn., to cost over \$500,000 with equipment.

Ohio Corrugated Culvert Co., Middletown, Ohio, has awarded a general contract to F. C. Williams, Inc., Middletown,

for a one-story plant to cost close to \$21,000 with equipment.

McKee Button Co., Muscatine, Iowa, is establishing a branch plant at Paducah, Ky., to cost about \$25,000 with equipment.

W. E. Harrison, 118 North Forty-third Street, Louisville, and associates have organized Perfect Syrup Pump Co., with capital of \$25,000, to manufacture special pumping machinery, and will establish local plant for parts production and assembling.

City Council, McKenzie, Tenn., is contemplating construction of a municipal airport, including hangar, repair and reconditioning shop and other field units, to cost over \$40,000.

Public Service Engineering Co., room 713, Guaranty Bank Building, Lexington, Ky., a subsidiary of Central Public Service Corporation, Chicago, has plans for construction of pipe line for natural gas supply in Indiana, about 250 miles, to cost over \$5,000,000 in connection with development of natural gas properties in eastern part of Kentucky.

Frankfort Chair Co., Frankfort, Ky., has plans for rebuilding three-story plant, 60 x 240 ft., at local State reformatory, recently damaged by fire, to cost over \$40,000 with equipment.

Chicago

CHICAGO, Sept. 2.—The tone of the local machine tool market is improving. Sales in the closing days of August brought the total for the month about even with July and the trade believes that the bottom of the sales curve has been reached. Miscellaneous inquiries are more in evidence and buyers are showing greater interest.

Prominent among the week's transactions are \$10,000 worth of drilling equipment and several miscellaneous items purchased by the Majestic Household Utilities Corporation, Chicago. This company is starting production in a new plant and further purchases are in the making. An 18-in. x 14-ft. lathe and a No. 2 miller will be purchased by the city of Chicago for the Thompson pumping plant. Continental Can Co. is in the market for machine tools and other can makers are considered prospects. Action on pending lists has been deferred again by the Chicago Board of Education.

Pillsbury Flour Mills Co., Metropolitan Life Building, Minneapolis, Minn., will build an addition to mill at Springfield, Ill., to cost over \$250,000 with elevating conveying, screening and other machinery.

A. Finkl & Sons Co., 1326 Cortland Street, Chicago, manufacturer of forgings, has purchased former plant of T. A. Cummings Foundry Co., adjoining rear of Finkl plant, consisting of a two-story unit, 150 x 150 ft., and will use for expansion.

Board of Park Commissioners, City Hall, Minneapolis, Minn., has awarded a general contract to Mads Madsen Co., National Building, for a three-story and basement addition to road equipment storage and distributing plant, to cost close to \$100,000 with equipment. Magney & Tusler, Inc., 104 South Ninth Street, is architect and engineer.

Bureau of Reclamation, Denver, is asking bids until Sept. 29 for construction of two transmission lines in connection with Boulder Canyon Dam project.

R. H. Gray, Austin, Minn., manufacturer of motor truck bodies, etc., is considering new one-story plant, to cost about \$30,000 with equipment.

Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, has plans for a two-story equipment storage and distributing plant, 300 x 326 ft., near Glencoe, Ill., including mechanical department, material depot, etc., to cost about \$350,000 with equipment. H. V. Von Holst, 79 West Monroe Street, is architect.

Board of Education, Fort Dodge, Iowa, plans installation manual training equipment in new two-story and basement high school to cost about \$225,000. Bids recently received on general contract have been rejected and new bids will be called soon. E. O. Damon, Jr., East Mason Street, and Frank L. Griffith, Snell Building, are architects.

St. Louis

ST. LOUIS, Sept. 2.—Corn Products Refining Co., 17 Battery Place, New York, and Board of Trade Building, Kansas City, Mo., is planning installation of a 4000-kw. steam turbo-generator unit and auxiliary equipment in connection with addition to power plant at North Kansas City mill. A belnding house and other production units will also be built, entire expansion to cost about \$2,000,000.

Ramopo-Ajax Corporation, 301 South Main Street, East St. Louis, Ill., manufacturer of railroad track equipment, has awarded general contract to Missouri Bridge & Iron Co., Fullerton Building, St. Louis, for a one-story addition, 50 x 50 ft., to cost about \$25,000 with equipment.

Philip D. C. Ball, Security Building, St. Louis, has purchased plant of Ryan Aircraft Co., at St. Louis-Lambert Field, a subsidiary of Detroit Aircraft Corporation, Union Trust Building, Detroit, which recently closed Ryan plant and transferred operations to Detroit. Purchase includes considerable machinery and new owner is contemplating production at plant for aircraft and parts.

State Board of Administration, State House, Topeka, Kan., Harry Rhodes, business manager, has awarded general contract to Sanneman Construction Co., 1009 Kansas Avenue, for two-story boys' industrial school, 65x148 ft., at North Topeka, to cost about \$100,000 with equipment. Joseph W. Radotinsky, State House, is State architect.

Elevating, conveying and other mechanical-handling equipment and general operating machinery will be installed in new printing plant to be constructed by St. Louis Post Dispatch, Twelfth and Olive Streets, St. Louis, to cost close to \$500,000.

Southwest Ornamental Iron Works, Inc., 1722 Tracy Street, Kansas City, Mo., has work under way on rebuilding part of plant recently destroyed by fire, to cost about \$25,000.

Longren Aircraft, Inc., Kansas City, Mo., care of L. Murphy, 1228 West Sixty-second Street, recently formed by Mr. Murphy and associates with capital of \$100,000, plans operation of a local plant for manufacture of aircraft and parts.

Southern Nebraska Power Co., Abilene, Kan., is planning steam-operated electric generating plant at Clay Center, Neb., to cost over \$50,000 with equipment.

Bartlesville Products Co., Bartlesville, Okla., manufacturer of mechanical equip-

ment, is planning a one-story addition for expansion in machine shop and grinding department, to cost over \$22,000 with equipment.

J. W. Sloan, Tulsa, Okla., and associates are planning construction of a hydroelectric generating plant on Illinois River, near Siloam Springs, Ark., to cost about \$200,000 with power dam and transmission line. Victor H. Cochrane,

City Council, Kirksville, Mo., is contemplating establishment of municipal airport, with hangar, repair shop and other field units, to cost over \$40,000 with equipment.

Indiana

INDIANAPOLIS, Sept. 2.—Beach & Arthur, Inc., 221 West South Street, Indianapolis, manufacturer of paper products, has awarded general contract to Harry Fitton, 958 North Pennsylvania Street, for a new one-story plant, 200 x 300 ft., with one-story and basement unit adjoining, 60 x 60 ft., to cost over \$100,000 with equipment.

City Council, Richmond, is considering enlargement of municipal electric light and power plant, with installation of generating and auxiliary equipment, to cost more than \$125,000.

Deep Vein Coal Co., Princeton, is planning construction of a new tippie at King Station Mine, to cost over \$100,000. Other expansion will also be carried out, with installation of mining and operating equipment.

Little Otter Creek Coal Co., Seelyville, is planning to rebuild part of tippie and surface buildings at mining properties destroyed by fire Aug. 25.

Keller Mfg. Co., Corydon, manufacturer of farm wagon trucks, agricultural tools and equipment, has filed notice of reorganization under same company name, with capital of \$100,000 and plans expansion.

George O. Lehman, 206 Indiana Trust Building, Indianapolis, and associates have organized a new company to manufacture a recently perfected headless multiple motor, with new type of internal combustion, designed for motor boats, farm tractors, etc., and plan establishment of a new plant for parts production and assembling.

Faris Pump & Mfg. Co., Inc., Indianapolis, has recently incorporated. It has been manufacturing electrically operated water pumps for about two years and contemplates expansion.

Lindenschmidt Co., Indianapolis, has plans for remodeling its machine shops and will install equipment for use in heavy metal work.

Milwaukee

MILWAUKEE, Sept. 2.—For some machine tool builders, August was a somewhat better month than July, but the average probably is more or less equal. The trade enters September with a more promising outlook and a confident belief that business is at last coming out of the depths. While the number of new orders is still limited improvement in inquiry has been well sustained and September is expected to develop a comparatively favorable volume of bookings.

United States Forest Products Laboratory, Madison, Wis., has engaged Holabird & Root, architects, 333 North Michigan Avenue, Chicago, to design new \$900,-

000 addition, for which appropriation recently was made available. Plans are expected to be completed by Dec. 1 and bids will be taken so that work may begin early next year.

Perfex Corporation, 335 Oklahoma Avenue, Milwaukee, manufacturer of automobile, truck, tractor and industrial gasoline engine cooling systems, is establishing new department in present works for manufacture of unit heating systems for industrial plants, warehouses, garages and other large spaces. T. C. Cornell, of long experience in air-conditioning research and engineering, will be in charge of new division.

Milwaukee Sewerage Commission, Jones Island, Milwaukee, is taking bids until Sept. 12 on three 15,000,000-gal. return sludge pumps and one 48-in. verturi meter, for installation in main sewage disposal plant on Jones Island, Robert Cramer is chief engineer.

National Brake & Electric Co., Milwaukee, division of Westinghouse Electric & Mfg. Co., will begin quantity production of a 40-hp. crawler type tractor which has been in development several years. Tractor is designed for construction and logging work and general farm service and industrial yard use. Present line of products includes gasoline switching locomotives, air compressors, farm, water and gas systems, car washing outfits, hydraulic presses, etc. P. L. Crittenden is vice-president and general manager.

Board of Regents, State Teachers' Colleges of Wisconsin, Madison, has instructed Arthur Peabody, State architect, to proceed with plans for new heat and power plant and gymnasium at Milwaukee State Teachers' College, Frank E. Baker, president. Appropriation of \$332,000 has been released for immediate use. Contracts probably will be awarded before Nov. 1. E. G. Doudna, Madison, is secretary of board.

Meronek Brothers, Stevens Point, Wis., manufacturers of potato planting machines, garage door systems, etc., have plans for new shop to cost \$30,000.

Robert A. Messmer & Brother, architects, 221 Wisconsin Avenue, Milwaukee, are taking bids until Sept. 11 for general construction of fourth unit of vocational school at West Allis, to cost \$80,000.

Western Cable & Electric Co., Baldwin, Wis., will ask bids soon for erection of new plant, designed by Arthur Lee, Hudson, Wis., to cost \$40,000.

Gulf States

BIRMINGHAM, Sept. 2.—Shell Petroleum Corporation, Shell Building, St. Louis, has awarded general contract to S. S. Jacobs Co., Jacksonville, Fla., for new oil storage and distributing plant at Birmingham, to cost about \$150,000 with equipment.

City Council, Laurel, Miss., has authorized a bond issue of \$40,000 for extensions and improvements in municipal airport, including hangar with repair facilities and other field equipment. T. G. McCallum is chairman of airport commission in charge.

Tampa Shipbuilding & Engineering Co., Tampa, Fla., is considering construction of new drydock with repair facilities, for which plans and estimates of cost will be made by William T. Donnelly, 247 Park Avenue, New York, consulting engineer.

City Council, Henrietta, Tex., is considering installation of a municipal electric light and power plant to cost over \$60,000 with equipment.

Walker Fertilizer Co., Orlando, Fla., has acquired property on Eloise Road, near Winter Haven, Fla., as site for a new plant, to cost over \$75,000 with machinery.

Texas Mining & Smelting Co., Laredo, Tex., recently chartered by F. G. Trowbridge, P. O. Box 1070, and associates, has awarded general contract to Alamo Iron Works, 130 Santa Clara Street, San Antonio, Tex., for a new one-story anti-mony smelting and refining plant, to cost over \$100,000 with machinery.

Southwestern Public Service Co., Amarillo, Tex., is contemplating extensions in steam-operated electric generating plant at Pampa, Tex., to double present capacity, to cost over \$85,000 with machinery.

Gulfport Fertilizer Co., Gulfport, Miss., has awarded general contract without competition to A. Ziegenfelder, N. & F. Hewes Building, for a one-story addition, 50 x 100 ft., to cost about \$25,000 with equipment.

Houston Independent School District, Houston, Tex., has awarded a general contract to L. B. Geiger, 2715 Palm Street, for new Taylor vocational school, to cost over \$125,000 with equipment.

Atchison, Topeka & Santa Fe Railway Co., Western Lines, Amarillo, Tex., has acquired property at Boise City, Okla., as site for new engine house and shops, to cost over \$50,000 with equipment. W. W. Kelly is chief engineer, address noted.

City Council, Beaumont, Tex., has plans for establishment of municipal airport on 275-acre tract, including hangar with repair facilities, administration building and other field units, to cost \$70,000. Frank Bertschler, park superintendent, will be in charge.

City Commission, McAllen, Tex., is considering establishment of municipal electric light and power plant, and will secure estimates of cost for equipment in near future.

Pacific Coast

SAN FRANCISCO, Aug. 28.—Oliver Chilled Plow Works, South Bend, Ind., has leased a one-story building, 100 x 153 ft., to be erected by Austin Securities Co., an interest of Austin Co. of California, 777 East Washington Street, Los Angeles, in Hostetter industrial district, for a new factory branch and distributing plant, to cost about \$45,000 with equipment.

Southern Sierras Power Co., Riverside, Cal., has secured permission to dispose of bond issues totaling \$1,374,000, part of proceeds to be used for expansion, including power plant and transmission line construction.

Shell Chemical Co., a recently organized subsidiary of Shell Oil Co., 200 Bush Street, San Francisco, has work under way on a new plant for manufacture of nitrogen products, fertilizer, etc., at Pittsburg, Cal., to cost over \$1,500,000 with machinery.

Board of Education, Santa Ana, Cal., plans construction of a vocational shop unit in connection with a new high school group on Frances Willard High School site, to cost \$300,000, for which general contract has been let to C. W. Pettifer, 1427 California Street, Long Beach, Cal. Allison & Allison, California Reserve Building, Los Angeles, are architects.

Portland Canal Power Co., Dexter-Horton Building Seattle, Willis T. Batchellor, president, has surveys under way for a new hydroelectric generating plant

on Portland Canal, near Hyder, Alaska, to cost over \$1,000,000 with steel tower transmission lines.

Apex Sheet Metal Works, 933 Twelfth Avenue, Seattle, is considering erection of a one-story plant, 70 x 125 ft., to cost about \$30,000 with equipment. Site has been acquired.

Douglas Aircraft Corporation, 3000 Ocean Park Boulevard, Santa Monica, Cal., has awarded a general contract to L. B. Norman, 1323 Georgina Avenue, for two-story addition, 50 x 50 ft., at works at Clover Field, to cost close to \$25,000 with equipment.

Coast Ice & Storage Co., Santa Cruz, Cal., has plans for two new ice-manufacturing plants at Santa Cruz and Monterey, respectively, each to cost over \$50,000 with machinery, and will begin work soon.

Bylesby Engineering and Management Corporation, Chicago, announces that California-Oregon Power Co. has been authorized to construct a hydroelectric project on Klamath River in Oregon. Work on first unit of about 50,000 hp. will be started as soon as other necessary arrangements can be made.

Canada

TORONTO, Sept. 2.—In connection with power development project to cost \$65,000,000 at Beauharnois, Que., for Beauharnois Power Corporation, Ltd., 1117 St. Catharine Street West, Montreal, following supplies are still to be purchased; switching equipment, air compressors, exciters, pumps, piping, conduits, gratings, roofing, steel sash, doors and window frames. General contractor is Beauharnois Construction Co.; F. B. Brown is consulting engineer.

Tenders will be called about Sept. 15 for power house addition, new turbine and two boilers for Lethbridge, Alberta, to cost \$200,000. F. Steedman is clerk.

Caledonian Box Mfg. Co., 1350 Spruce Street, Winnipeg, has let contract to Pain & Roe, Royal Bank Building, for a one story factory, 90 x 112 ft.

Diatomite Products, Ltd., Northern Ontario Building, Toronto, has started work on foundations for factory at Martin's Siding, near Huntsville, Ont., to cost \$60,000. C. L. Wood is engineer in charge.

Canadian Sumner Iron Works, 560 Vernon Drive Vancouver, B. C., will build a new machine shop on Boundary Road, one story, 104 x 240 ft., to cost \$30,000.

Foreign

WORK has been started by Soviet Russian Government, Moscow, on new electrolytic copper plant near Sverdlovsk. Mill will have an annual production of 100,000 tons of refined copper, and will cost 22,000,000 rubles, of which about 4,500,000 rubles will be expended during first year.

A company has been organized at Buenos Aires, Argentina, to construct and operate a system of light railroads in conjunction with grain elevators, with elevating, screening and other machinery. Company is capitalized at 50,000,000 pesos (about \$18,500,000) and has secured a concession from Government for construction of grain elevators at San Pedro, Ramallo, Obligado and San Nicolas. Further information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Argentina No. 112235.

Electro Bank of Zurich, Switzerland, operating subsidiary interests for electric light and power service, has arranged for an increase in capital to total about \$5,000,000, part of fund to be used for expansion. With affiliated interests, Electro Bank has organized a company to develop electric light and power utilities in Spain, including power plant and transmission lines, and has also made offer to Government of Roumania for electrification of Province of Transylvania. Bonbright & Co., 25 Nassau Street, New York, bankers, are identified with these projects.

Kreuger & Toll, Stockholm, Sweden, operating paper and pulp and other industrial properties, have acquired a con-

trolling interest in copper mines at Boliden, Sweden, and plan increased output.

Japan Soda Industry Co., Tokyo, Japan, is planning to increase capacity at soda ash manufacturing plant from 100 to 150 tons per day. Japanese Government is interested in enterprise.

Concrete Reinforcing Steel Institute will hold its semi-annual meeting at Briarcliff Lodge, Westchester County, New York, Oct. 20 to 22. M. A. Beeman, Tribune Tower, Chicago, is secretary.

New Trade Publications

Advertising New York.—General Outdoor Advertising Co., 1 Park Avenue, New York. Pamphlet of 32 pages featuring the facilities of New York as a marketing center. It deals not only with the city as a corporate unit but also with the suburbs over the commutation range. It gives the number of workers engaged in gainful occupations, figures on income tax returns, banks, manufactures, realty valuations, budget, public improvements, hotels, conventions, theaters, passengers on subways and other transportation units, churches, schools, colleges, airports and the consumption of certain food products. It is more than a mere statistical presentation, being illustrated by maps and with analyses of buying powers of different districts. The entire trading area is credited with a population of 9,688,000.

Ramming Mixture.—Charles Taylor Sons Co., Cincinnati. Seven-page booklet on "Sillimanite" ramming mixture for use in monolithic linings in oil and gas-fired furnaces, and electric furnaces used for melting brass, aluminum and special steel alloys.

Speed Reducers.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1891, including full information regarding application, construction, ratings and dimensions of vertical type speed reducers for single and double reductions and right angle drives.

Galvanized Products Preservative.—Liquid Metal Products, Inc., 231 South La Salle Street, Chicago. A 23-page pamphlet describing uses and application of Stibloy, which is a metal compound in liquid form, developed to extend the life of galvanized surfaces, thus protecting them from the effects of atmospheric conditions, and from damage caused by exposure to gases, acid fumes, smoke and brine.

Speed Reducers.—Winfield H. Smith, Inc., Springfield, N. Y. Catalog 25 describes a complete line of speed reducers of small and fractional horsepower capacity. Many new speed reducers, including a new line of ball and roller bearing equipped units, are shown in this catalog, also a line of light power transmission machinery, such as grooved pulleys, small hangers, pillow blocks, collars and couplings.

Painting Sheet Metal.—American Chemical Paint Co., Ambler, Pa. Bulletin No. 16, illustrated with excellent photomicrographs, describes the process in vogue for the preparation of sheet metal surfaces for painting. There are 16 pages in the booklet.

Gas Unit Heaters.—Buffalo Forge Co., Buffalo, N. Y. Bulletin 2754 of four pages, illustrating and describing gas-fired unit heaters for industrial installation. Safety pilot shuts off motor if gas should go out for any reason.

Industrial Lubrication.—Alemite Corporation, 2676 North Crawford Avenue, Chicago. Bulletin of eight pages, bringing out the advantages of Alemite lubrication and showing installation views.

Cupola Flux.—Mathieson Alkali Works, Inc., 250 Park Avenue, New York. Bulletin 305 of four pages, dealing with the use of Purite in cupola control. This chemical is closely related to limestone, except that it melts at a much lower temperature.

Tramrail Equipment.—Cleveland Electric Tramrail, Wickliffe, Ohio. Four-page folder, illustrating and describing various types of tramrail equipment, such as tramrail overhead carriers, racks, rails, etc.

Squirrel-Cage Motors.—Louis Allis Co., Milwaukee. Bulletin 510, six pages, illustrating and describing totally-enclosed, fan-cooled squirrel-cage motors, from 3 to 100 hp. This machine is tightly sealed, yet easy to take apart, and is said to be economical to install, operate and maintain under severe conditions.

Railroad Equipment.—Whiting Corporation, Harvey, Ill. 16-page bulletin entitled "Operation and Maintenance," dealing with replacements and spare parts, etc. Descriptive illustrations and diagrams are included.

Metal-Working Machinery.—Quickwork Co., St. Marys, Ohio. Catalog 90 of 88 pages, bound, with illustrations, devoted to a large line of rotary shears and machines for edging, wiring, beading, seaming and hammering operations in the manufacture of automotive sheet-metal parts and general sheet-metal work.

Toolwork, Dies and Special Machines.—City Machine & Tool Works, Dayton, Ohio. Four-page folder briefly describing various types and sizes of toolroom products, such as jigs, fixtures, dies, special machines, gear-grinding chucks, gear-chamfering machines, etc., also designing service.

Gear Burnisher.—City Machine & Tool Works, Dayton, Ohio. Four-page folder, illustrating and describing the Bolender model 2 gear burnisher, outstanding features claimed for which are more output and complete automatic operation.

Proposed Tariff for Great Britain Raises Economic Controversy

(By Cablegram)

LONDON, Sept. 1.

BANKERS, merchants and manufacturers have combined in issuing a counterblast to the recent "bankers' manifesto" (which urges the imposition of a general tariff), stating that the reasons advanced for a reversal of the British system of free ports and open markets are inadequate, and that there is no reason to suppose that the proper remedy for the present trade depression consists in adding to the customs duties, and thus diminishing foreign trade. The signatories do not believe that any stimulus which might be afforded by protection could compensate for the mischief caused, and see no prospect that such retaliation would cause a reduction in the tariffs of foreign countries.

Pig iron output is restricted, but is in ample volume to cover present needs. Indian and Continental iron are coming in. There is possibly a little more active inquiry and disposition to make forward contracts. Hematite is in large supply, with demand no better.

Heavy steel industry is in very poor condition and the outlook is obscure. That there have been seriously large dismissals of railroad workers reflects the stagnation in heavy industries.

Soviet authorities are anxious to place orders for new ships on the

Oppose General Tariff for Great Britain as Not Calculated to Help Present Situation.

* * *

Indian Boycott of British Goods Brings Sheet Orders to Japan.

* * *

Japanese Can Maker May Buy Tin Plate Mill Equipment in Germany.

* * *

German Skilled Workers, Unable to Obtain Employment at Home, Are Migrating to Russia and Far East.

* * *

German Shipyards for First Time Have More Foreign Contracts Than Domestic.

Clyde, but financial arrangements suggested offer a grave obstacle and the business may go to Germany.

Tin plate inquiry for 55,000 boxes for South America has caused outside works to accept figures well below the schedule. Tropical heat has caused general stoppages of the Welsh tin plate mills.

Galvanized sheet markets are extremely quiet. Some works are closed; the remainder are operating at only a fraction of full capacity.

In black sheets a little business is being done with Japan.

Continental steel markets are cha-

otic. The abortive attempt to control prices of semi-finished steel and beams has now been abandoned, and the works are scrambling for orders, with prices demoralized.

In Belgium the Société Anonyme Metallurgique de Sambre et Moselle, Montigny, is repairing and modernizing its (three) blast furnaces. Belgian output in July was 259,000 metric tons of pig iron and 255,000 tons of crude steel. There were 49 furnaces blowing at the end of the month.

In France the Société Anonyme des Laminaires, Hauts-Fourneaux, Forges, Fonderies et Usines de la Providence has blown in a fifth furnace at Rehon.

German postal authorities have placed orders for buildings for the telegraph, telephone and cable engineering trades valued at 200,000,000 m. (\$47,600,000), with a view to assisting employment. Meanwhile the German railroads propose to place orders aggregating 350,000,000 m. (\$83,300,000) for locomotives, rails, etc.

Ruhr coal mine owners are demanding a wage cut of 10 per cent.

German shipyards have booked orders for six motor-driven tankers for the German subsidiary of the Standard Oil Co.

German output of rolled steel in July was 664,000 metric tons.

Polish output in July included 38,000 metric tons of pig iron and 113,000

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.	£11 10s.	\$55.95
Billets, open-hearth....	5 17½ to £6 5s.	28.46 to \$30.41
Black sheets, Japanese specifications	12 5s.	59.61
Tin plate, per base box..	0 17½ to 0 18	4.32 to 4.38
Steel bars, open-hearth..	7 15 to 8 5	1.69 to 1.79
Beams, open-hearth....	7 7½ to 7 17½	1.60 to 1.71
Channels, open-hearth....	7 12½ to 8 12½	1.66 to 1.87
Angles, open-hearth....	7 7½ to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	9 10 to 9 15	2.06 to 2.12
Galvanized sheets, No. 24 gage	11 17½	2.57

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2 13s. to £2 14s.	\$12.90 to \$14.14
Billets, Thomas (nominal)	4 7	21.17

Wire rods, low C., No. 5 B.W.G.	£6 2s. to £6 4s.	\$29.69 to \$30.19
Rails, light.....	6 0	29.20
Black sheets, No. 31 gage, Japanese	11 5 to 12 12	54.68 to 58.32
Steel bars, merchant....	4 5 to 4 7	0.94 to 0.96
Steel bars, deformed....	4 10 to 4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal) ..	4 18 to 5 0½	1.09 to 1.11
Channels, Thomas, American sections	5 12 to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick	4 8 to 4 9	0.97 to 0.98
Angles, Thomas, 3-in....	4 4 to 4 5	0.93 to 0.94
Hoop and strip steel over 6-in. base.....	5 0	1.10
Wire, plain, No. 8 gage..	6 0 to 6 12½	1.32 to 1.46
Wire, barbed, 4-pt. No. 12 B.W.G.	10 0 to 11 0	2.21 to 2.43
Wire nails, base.....	6 2½ to 6 12½	\$1.35 to \$1.46 a keg

tons of raw steel. The Polish Government is guaranteeing credits up to 40 to 50 per cent of invoice values to stimulate exports. A still bigger guarantee attaches to Russian business.

Czechoslovakian output in July included 111,400 metric tons of pig iron and 154,700 tons of raw steel.

French and German Hoop Makers Reach Agreement

HAMBURG, GERMANY, Aug. 20.—French and German manufacturers of steel hoops have reached an agreement, by which the French makers will have a fixed annual allotment for export of hot and cold rolled hoops to Germany. The agreement further provides that the hoops will be sold to German consumers at the full market price as charged in Germany. The agreement is expected to end a period of serious competition between the French and German mills in the German market.

Japan Cultivating Indian Galvanized Sheet Market

YOKOHAMA, JAPAN, Aug. 4.—The Calcutta, India, representative of the Japan Export Galvanized Sheet Manufacturers' Association has reported a general increase in demand for the Japanese product as a result of the boycott of British goods. It is estimated by the association that proper cultivation of the Indian market may bring the total exports to Calcutta alone to about 50,000 metric tons for this year.

German Skilled Workers Moving Abroad

HAMBURG, GERMANY, Aug. 20.—German skilled workmen in the heavy hardware and non-ferrous metal industries, unable to obtain employment at home, are emigrating to Russia, the Far East, and to North and South American countries. They are aiding these countries to build up strong competitive industries, but there is no way at present of preventing this movement from Germany of workers, who will be greatly needed when industrial activity improves.

Germany Building Mostly Foreign Ships

HAMBURG, GERMANY, Aug. 20.—Two fire ships costing \$474,000 have been ordered by the Government of the Philippines from the Schichau Werft, Elbing. German shipbuilders have been booking some substantial tonnage from foreign sources, including large private yachts. The "Orion," a private yacht for a New Yorker, had a displacement of 3000 tons and was the largest yacht ever built in Germany, but recently Blohm & Voss of Hamburg received a contract for a 5000-ton yacht for an American. This yacht, now under

construction, is of about the size of an ordinary cargo-carrying ship and will be equipped with steam turbines instead of Diesel motors.

German shipyards have a larger tonnage of construction for foreign customers than from domestic sources. On July 1, 215,220 tons of shipping was being built for foreign account and only 81,730 tons for German companies. Prior to the war only 5 to 8 per cent of all ships built in Germany were for foreign interests, while the average since the war has been 20 to 30 per cent.

European Exporters Refuse to Accept Rust Claims

HAMBURG, GERMANY, Aug. 20.—Continental insurance companies are declining to insure iron and steel products against rust during export shipment, and Continental exporters are refusing to accept orders, especially from South American markets, where unpacked shipment is specified on the condition that the seller accept the risk of rust. The refusal of exporters to accept the risk of rust in shipment applies particularly to wire rods and wire nails, as they claim that even a slight amount of rust usually brings a claim, although in the case of wire rods, beams and bars a slight film, unavoidable in ocean shipment, does not in any way damage the goods.

Japan May Buy German Tin Plate Equipment

YOKOHAMA, JAPAN, Aug. 4.—The Oriental Can Mfg. Co. of Osaka, which recently had a representative in the United States, is said to have sought a special discount on tin plate from American and Welsh makers, but without success. Preparations are going forward for the installation of a tin plate mill at the company's Osaka plant, in connection with which a representative will soon be sent to Germany to investigate machinery and other equipment.

Japan Increasing Asiatic Export Trade

YOKOHAMA, JAPAN, Aug. 4.—Intensive efforts by the Government Steel Works to develop foreign markets have resulted in the export of 2303 metric tons of rails, plates, bars and sheets in July. This compares with 1120 tons in June. The chief markets being developed are Dairen, Manchuria; Newchang, Tientsin, Shanghai in China, Manila in the Philippines and Vladivostok in Siberia.

A "Preliminary Report on Molding Sands in Eastern Canada," by C. H. Freeman, is contained in Publication No. 710 of the Mining Branch of the Department of Mines of Canada, entitled "Investigations of Mineral Resources in the Mining Industry, 1928."

Cartel Control on Export Prices Ceases

(By Radiogram)

BERLIN, Sept. 1.

REGULATION of export prices of semi-finished products and joists (beams) has been abandoned by the International Steel Cartel. Export prices of all products controlled by the cartel are now free [from restriction].

As the outputs of member countries have fallen below their quotas, the cartel's function of restricting production has become inoperative and the cartel has entirely ceased to influence the market.

Export prices have weakened further. Belgium is exporting bars at £4 6s. a metric ton (0.95c. a lb.) f.o.b.; Germany, at £4 9s. (0.98c.).

German works have refused some South American and Scandinavian orders on the ground that the prices offered are unremunerative.

Domestic prices are unchanged and the market is dead. It is the prevailing view that export prices have about touched bottom, and a revival is expected to materialize in the autumn.

Sawmill Machinery Market in Europe Surveyed

With a view to assisting American exporters to increase their sales in western Europe, the Industrial Machinery Division, Department of Commerce, has published Bulletin No. 715, entitled "Markets for Sawmill and Woodworking Machinery in Western Europe." This bulletin describes the sawmill and woodworking activities of the various countries and outlines methods at present in use, shows the different types of machinery now in operation and the source of machinery.

It shows also the current production and sales methods, in addition to giving many practical hints on extending old and obtaining new business. European machines largely predominate in western Europe, but some American equipment has been installed in the sawmill plants in connection with the movement to replace the old machinery with modern equipment. The bulletin says there appears to be an expanding market for special lines, particularly high-speed high-production machinery.

Steel Barrel Shipments

July shipments of steel barrels by members of the Steel Barrel Manufacturers Institute are reported at 441,227. Productive capacity was occupied during the month to an average of 35.1 per cent, representing 23.1 per cent of capacity for I. C. C. barrels and 38.4 for light barrels. The volume of business was \$1,132,470. Unfilled orders on Aug. 1 were 408,608 units.

Exports and Imports Drop for Fourth Consecutive Month

WASHINGTON, Aug. 26.—Exports of iron and steel products from the United States in July were the lowest since February, 1925. Imports were the lowest since November, 1924. The July drop in exports was the fourth consecutive decline and, as in the import movement, the falling off is attributed principally to the world-wide business depression.

In the first seven months exports were approximately 28 per cent below those of the like period last year. Similarly, imports were about 27 per cent below the corresponding period of 1929.

The decline in exports was featured by a smaller movement to Japan, which dropped to 11,269 tons from

36,909 tons. Also there were lessened shipments of scrap. Exports to Canada, the leading consumer of American exports, totaled 60,632 tons, a slight gain over the 60,299 tons in June. Shipments to Canada included 10,444 tons of plain structural shapes, 9690 tons of skelp, 7006 tons of tin plate, 6299 tons of "other plate" and 5665 tons of scrap. Shipments to Japan, the second largest market, included 6423 tons of scrap, 2026 tons of tin plate and 1043 tons of black welded steel pipe.

Of total exports in the seven months, 48.7 per cent went to North and Central America and the West Indies. Shipments to South America for this period were 13.3 per cent.

Those to the Far East were 27.5 per cent and to Africa they were only 1 per cent.

Exports of pig iron in July were the lowest in more than 30 years. Exports of scrap were the lowest since February, 1927.

The July decline in imports was the fourth consecutive monthly drop. The principal declines, when compared with June, were in structural shapes and sheet piling. The only gains amounting to as much as 1000 tons were those in the receipts of pig iron and sponge iron, 3037 tons. The 75 tons of sponge iron imported in July came from Sweden. Belgium supplied 9694 tons of the July imports, leading all other countries.

Exports of Iron and Steel from the United States
(In Gross Tons)

	July		Seven Months Ended July	
	1930	1929	1930	1929
Pig iron.....	453	7,777	9,624	38,572
Ferromanganese.....	216	40	5,492	1,053
Scrap.....	14,731	49,358	293,176	301,436
<i>Pig iron, ferroalloys and scrap.....</i>	<i>15,400</i>	<i>57,175</i>	<i>308,292</i>	<i>341,061</i>
Ingots, blooms, billets, sheet bar.....	317	1,236	14,547	32,474
Skelp.....	9,698	13,976	64,866	67,771
Wire rods.....	2,266	5,823	28,117	28,883
<i>Semi-finished steel.....</i>	<i>12,281</i>	<i>21,035</i>	<i>107,530</i>	<i>129,128</i>
Steel bars.....	4,684	17,183	60,964	123,648
Alloy steel bars.....	145	546	4,920	11,946
Iron bars.....	122	167	1,003	3,921
Plates, iron and steel....	7,874	19,675	69,516	126,971
Sheets, galvanized steel....	7,325	14,148	59,752	98,044
Sheets, galvanized iron....	555	1,418	4,145	11,585
Sheets, black steel.....	7,038	18,259	74,762	113,585
Sheets, black iron.....	1,097	1,428	7,064	8,973
Hoops, bands, strip steel.	2,186	4,871	28,645	47,729
Tin plate;terne plate....	17,921	16,875	145,312	152,996
Structural shapes, plain material.....	11,932	29,002	91,098	174,868
Structural material, fabricated.....	6,494	10,266	63,690	64,937
Tanks, steel.....	1,605	.....	9,468	.....
Steel rails.....	8,413	9,999	63,046	92,391
Rail fastenings, switches, frogs, etc.....	1,472	3,102	12,195	20,148
Boiler tubes.....	765	1,770	10,101	11,332
Casing and oil-line pipe....	3,237	6,447	45,003	79,281
Pipe, black and galvanized, welded steel.....	5,743	14,880	53,208	83,664
Pipe, black and galvanized, welded iron.....	934	.....	10,627	.....
Plain wire.....	1,815	3,591	17,398	29,718
Barbed wire and woven wire fencing.....	3,552	5,695	26,184	41,383
Wire cloth and screening....	161	125	1,026	1,027
Wire rope.....	294	736	3,014	4,657
Wire nails.....	844	962	4,660	8,634
Other nails and tacks....	433	1,423	3,836	7,058
Horseshoes.....	8	37	77	220
Bolts, nuts, rivets and washers, except track..	821	1,232	6,846	9,359
<i>Rolled and finished steel.</i>	<i>97,470</i>	<i>182,419</i>	<i>877,554</i>	<i>1,316,490</i>
Cast iron pipe and fittings	2,586	3,852	21,486	20,778
Malleable iron screwed fittings.....	680	1,070	7,108	7,426
Car wheels and axles....	382	1,645	9,290	14,112
Iron castings.....	356	901	4,649	7,980
Steel castings.....	729	966	6,700	7,265
Forgings.....	813	1,039	5,800	8,252
<i>Castings and forgings...</i>	<i>5,546</i>	<i>9,473</i>	<i>55,033</i>	<i>65,813</i>
All other.....	1,075	1,858	5,364	11,271
Total.....	131,772	271,960	1,356,773	1,863,763

Imports of Iron and Steel Products into the United States
(In Gross Tons)

July, 1930		July, 1929	
Austria.....	16	United Kingdom.....	3,097
Belgium.....	9,694	Europe.....	26,793
Czechoslovakia.....	19	Canada.....	3,850
France.....	3,260	British India.....	8,238
Germany.....	6,459	Hong Kong.....	1
Italy.....	124	Japan.....	4
Netherlands.....	496	New Zealand.....	814
Norway.....	2,235		
Sweden.....	1,274	Total.....	39,700
Switzerland.....	119		

July		Seven Months Ended July	
1930	1929	1930	1929
Pig iron.....	9,756	6,743	71,309
Sponge iron.....	75	.....	80,204
Ferromanganese and spiegeleisen*.....	5,020	5,413	35,669
Ferrosilicon†.....	18	142	162
Ferrosilicon‡.....	187	1,079	3,802
Other ferroalloys.....	240	.....	240
Scrap.....	2,343	9,101	15,729
<i>Pig iron, ferroalloys and scrap.....</i>	<i>17,639</i>	<i>22,478</i>	<i>126,911</i>
Steel ingots, blooms, billets, etc.....	2,507	3,519	10,784
Wire rods.....	485	1,242	6,182
<i>Semi-finished steel.....</i>	<i>2,992</i>	<i>4,761</i>	<i>16,966</i>
Concrete reinforcement bars.....	849	.....	.....
Hollow bar and drill steel	77	3,209	21,835
Merchant steel bars.....	3,490	.....	21,481
Iron bars.....	24	127	752
Boiler and other plate....	51	34	1,787
Sheets, skelp and saw plate.....	254	2,818	15,458
Tin plate.....	793	31	878
Structural shapes.....	6,514	18,247	88,521
Sheet piling.....	436	1,067	2,852
Rails and rail fastenings.	505	.....	.....
Welded pipe.....	358	3,192	12,284
Other pipe.....	388	577	2,733
Barbed wire.....	272	490	3,117
Round iron and steel wire	.....	.....	.....
Telegraph and telephone wire.....	5	.....	24
Flat wire and strip steel.	52	137	792
Wire rope and strand....	179	247	1,623
Other wire.....	17	17	206
Hoops and bands.....	2,375	6,770	11,693
Nails, tacks and staples..	611	800	2,928
Bolts, nuts and rivets....	9	29	244
Horse and mule shoes....	.....	1	8
<i>Rolled and finished steel</i>	<i>17,259</i>	<i>37,793</i>	<i>167,735</i>
Cast iron pipe and fittings	1,734	6,383	7,892
Castings and forgings....	76	164	1,018
Total.....	39,700	71,579	320,522
Manganese ore*.....	15,940	48,406	194,329
Iron ore.....	251,035	301,418	1,846,586
Magnesite (dead-burned)	3,804	.....	25,211

*Manganese content.
†Chromium content.
‡Silicon content.

Drop in Machinery Exports in July, but Seven-Month Total Is Second Highest Ever Reached—Im- ports Below Last Year

WASHINGTON, Aug. 29.—Exports of machinery in July made the poorest showing since September, 1928. In the first seven months, however, exports were second only to the great record of \$361,647,622 in the like period of last year.

Exports of industrial machinery in July were \$17,986,482, against \$21,000,000 in June, and \$24,322,394 in July, 1929, according to the classification of the Division of Statistics, Department of Commerce. In the first seven months similar exports were \$155,347,885 in 1930, compared with \$157,609,720 in 1929.

Exports of power-driven metal-working machinery in July were \$2,895,309, against \$2,917,137 in July of last year. In the first seven months they were \$24,880,461, against \$20,045,627 in the corresponding period of last year.

Imports of machinery and vehicles for the first seven months of 1930 were \$21,305,535, against \$25,994,738 in the corresponding period of last year.

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	July		Seven Months Ended July	
	1930	1929	1930	1929
Locomotives	\$102	\$814	\$538	\$1,748
Other steam engines.....	11	17	121	289
Boilers	120	109	686	1,145
Accessories and parts....	70	57	599	560
Automobile engines.....	467	549	5,022	8,297
Other internal combustion engines	622	816	5,822	5,950
Accessories and parts....	249	428	2,253	2,790
Electric locomotives.....	54	121	540	563
Other electric machinery and apparatus	936	1,197	6,411	7,877
Excavating machinery....	1,035	918	6,969	5,060
Concrete mixers.....	33	167	628	877
Road-making machinery....	371	313	2,304	2,144
Elevators and elevator machinery	319	452	3,498	3,033
Mining and quarrying machinery	964	1,688	10,282	10,050
Oil-well machinery.....	1,646	2,346	17,480	15,229
Pumps	670	1,018	5,894	7,264
Bending and power presses	222	386	2,822	2,224
Forging machines.....	157	141	1,345	914
Machine tools*.....	2,516	2,913	16,243	20,041
Other metal-working machinery and parts.....	491	633	4,149	4,537
Textile machinery.....	1,227	1,192	12,042	8,180
Sewing machines.....	402	994	4,672	6,180
Shoe machinery.....	116	124	1,046	1,184
Flour-mill and gristmill machinery	29	40	2,301	343
Sugar-mill machinery....	621	197	2,233	1,639
Paper and pulp-mill machinery	345	293	1,943	1,901
Sawmill machinery.....	40	65	519	533
Other woodworking machinery	151	254	1,080	1,413
Refrigerating and ice-making machinery	197	404	2,047	2,555
Air compressors.....	500	733	4,030	4,573
Typewriters	1,017	2,396	11,079	14,605
Power laundry machinery....	78	256	990	1,248
Typesetting machines.....	313	485	2,389	3,569
Printing presses.....	355	536	3,103	4,402
Agricultural machinery and implements	7,403	14,722	86,389	86,791
All other machinery and parts	14,158	19,052	122,481	121,940
Total	\$38,007	\$56,826	\$351,950	\$361,648

*Principal details in another table.

Machinery Exports and Depressions

(Concluded from page 629)

would be 645. The 1921 depression was world-wide, and export shipments collapsed much as did domestic orders, although the decline was somewhat less rapid and did not go below an index number of 91.3. Since that time the recovery has been definite, and except for the experience of 1926, reasonably uniform, and even though June and July exports were off, there is no indication that the export demand for machine tools has felt or will feel a break that will correspond to the collapse experienced in domestic demand since 1929.

Obviously, the markets of the world can absorb huge volumes of metal-working machinery in spite of the fact that reports from most countries indicate that the general business situation in each is bad. Many countries are hungry for industrial development and properly cultivated it should be possible to continue to export huge quantities of metal-working machinery.

The trend line on the chart ends at 313, which figure represents the average of 1929. While monthly figures fluctuate considerably, the average for seven months of this year is 312.8, or substantially the same as the average for last year. This year's monthly figures are given in the accompanying table.

	Value	Index
January	\$3,861,450	291.5
February	3,511,822	265
March	4,346,019	328
April	4,964,862	375
May	5,035,182	380
June	3,897,638	294
July	3,385,885	256

Exports worked up to a peak in May very much above anything experienced since early 1920. It may be that the drop in June and July is significant, but on the other hand it would not be surprising if, contrary to what might seem to be the present trend, the figures for subsequent months would show expansion.

From the point of view of the individual enterprise, all of these curves are deceptive because of their regularity. If the curve representing export had been plotted on a monthly instead of an annual basis the resulting diagram would have been found to be very much of a saw-tooth affair. If the curve of machine tool orders had been plotted on the basis of the monthly experience of the individual manufacturer instead of on the quarterly basis for the association as a whole, it also would undoubtedly show even wider swings. Consequently, in applying this information to the management of the individual enterprise, certain allowances should be made. At the same time it will be recognized that export orders have proved to be very much of a stabilizing influence in 1920, 1921, 1922, 1924, 1925, 1927 and 1928, and probably will be

much more valuable in 1930, if it is safe to assume that present trends will continue.

In connection with all of the above, it is interesting to attempt to reduce this material to dollar values. According to the census of 1927, the total production of machine tools and metal-working machinery for other years was a little in excess of \$191,000,000, which suggests that for the country as a whole 100 on the index number would be just under \$138,600,000. The exports similarly would suggest that the index number of 100 is about \$13,275,000, suggesting that, for 1927, 9.6 per cent of American production of metal-working machinery was exported. Obviously, this also is the product of poor statistical method, but is interesting nevertheless.

Forgings Hardened Without Warping

(Concluded from page 627)

furnace would reach carburizing heat—approximately 1675 deg. Fahr.—where it is held for about 36 hr. to give a case showing a full 1/16-in. rim on the quenched spy bar. During this time the temperature is watched carefully and maintained uniform by the simple means noted above.

After the charge has been at carburizing heat for, say, 30 hr., one of the short pieces of steel bar is pulled out of each of the boxes, quenched in cold water, nicked and broken. This gives correct information about the depth of case achieved, and from it the foreman can estimate the additional time required for each pot. When that time has elapsed, the second short bar is withdrawn, quenched and broken. It is used to check the indication of the first bar. When the last one shows a rim of correct thickness, the oil burners are extinguished and the furnace sealed. The long spy bars may also be withdrawn, quenched and broken into 6-in. pieces, to indicate the uniformity of case from top to bottom. Sometimes they accompany the guide bar to the end, and may be studied as representative of the carbon and hardness distribution of the completed guide.

The steel guides are left in the pots to cool at a deliberate rate in the furnace, in order to give the carbide ample time to diffuse inward, thus producing an even carbon gradient from case to core—a very desirable condition to avoid shelling or exfoliation during quenching or subsequent use. When the temperature has reached about 600 deg. Fahr. the fires are again lighted. Within 8 hr. the pyrometers show that the center of the furnace has reached 1450 deg. This is then maintained for 4 hr., so that the center of the pots may reach correct temperature. Shortly before the end the furnace is raised 50 deg. to make sure the pieces will be quenched from a rising temperature. When the time is reached, the clay is broken away from the top of the box, the carburizing compound dug away to expose the top of the guide, it is gripped by tongs, pulled up out of the box by a crane and immediately quenched. This work causes no change in the furnace temperature; in fact, a whole box can be removed and the roof sealed with a tile without disturbing the heat inside an adjoining box.

The quenching apparatus, while efficient, is quite simple. A round steel tank is used for an overflow

sump. At its center is fixed in an upright position a 10-ft. length of 16-in. cast iron pipe, such as is used for carburizing boxes. A 4-in. water pipe discharges under pressure at the very bottom of this vertical cast iron pipe (which is really the quenching tank), filling it with a steadily ascending current of cold water.

When surface inspection shows satisfactory file hardness, the protection bolts are taken out of the open holes, the scale removed and the guide delivered to the machine shop. There the face and edges are ground flat, and the piece is ready for the locomotive erecting crew.

In some recently made guides an extra deep case was specified. This was produced by a double carburizing heat. The guide was packed and heated, as described above, but after 15 hr. at 1675 deg. Fahr. the box was withdrawn from the furnace and cooled in the air. The used carburizer was then discarded, the guide repacked and given a second 15 hr. at carburizing heat. This gives about 50 per cent deeper case than the single heat described, and produces the desired surface after the proper quench.

Scientific Control of Steel Production

(Concluded from page 623)

sponse to welding and to heat treatment.

This friendly feeling on the part of customers has been of great assistance in filling promptly many rush orders. Steel of the exact specification might not have been available for quick shipment, but after considering the actual requirements, the metallurgists of steel company and steel consumer agreed that a slightly different composition would be entirely adequate when the workmen in the customer's plant had been notified what to expect and how to make minor adjustments, for instance, in a heat-treating schedule.

An example of the forms used for the application of this practice to an order now completed is shown herewith, as follows:

The mill order showing the customer's specifications as to analysis and size, and bearing the metallurgical ladle analysis limits, desired grade, and carrying with it reference to a special practice for rolling—Form 518.

Copies of open-hearth recorders' records on heat 8183, and the blooming mill recorder's record on the same heat, detailing the practice employed and showing for reference the check analysis, analysis of two ingots held special by the open-hearth recorder, and grade of etch test called for.

Abrasive-Wheel Selection

(Concluded from page 631)

The second symbol in the marking represents grain size—used in exactly the same manner as formerly.

Regular Alundum abrasive.....	(Blank)
No. 38 Alundum abrasive.....	38
No. 19 Alundum abrasive.....	19
No. 25 Alundum abrasive.....	25
No. 99 Alundum abrasive.....	99
Crystolon abrasive.....	37

Grade is designated by letters, as formerly, from *E* to *Z*, with *E* representing the softest grade and *Z* the hardest. To make the new system uniform and

Business as Others See It

Digest of Current Financial and
Economic Opinion

IMPROVEMENT in sentiment is reported from many quarters, though business is said still to be "marking time." And the feeling appears general that expansion of business activities will be less pronounced than often occurs in the autumn months.

Several commentators stress the belief that goods are used up faster than they are made. This is believed to foreshadow the early need to make enough to re-stock merchants' shelves. At the same time the disparity between retail and wholesale prices brings the suggestion that a more normal relation will result, not from any rise in basic materials prices but through a decline in retail prices, and hence in the cost of living.

Here comes in again the question of wage rates, in connection with the lowered living cost. *Annalist* argues that it would be better to lower wages and provide more employment through the wider use of

labor — particularly in building, where present wage rates are notoriously out of line and are hampering residential construction activity, because the average man cannot afford to build a house at current wages.

Many People Not Eager to Work

Unemployment is regarded by *Commerce and Finance* as nothing alarming. "The unemployed are not generally very eager to work, and few authenticated cases of suffering have come to light. . . . The itinerant workers are very 'choosey' as to the jobs they will take, and rely upon the philanthropy of the community when their needs become urgent."

National City Bank of New York cannot see great cause for worry when analysis of earnings of 550 corporations shows 9.2 per cent (annual rate) for first half of 1930, even though 1929 did show

14.8 per cent and 1928, 11.7 per cent.

Recovery Held to Be at Hand

Business Week places the low turning point of the present movement at the end of July or early in August. At present, indicators point upward; a year ago they pointed downward, says that journal.

Since our monetary and credit structure is not only sound but unusually strong, and commercial credits are liquid and production for some months has probably been less than current demands, Harvard Economic Society sees "every prospect that the recovery . . . will not be long delayed," but believes that autumn business will not acquire so much impetus as we have been expecting. "The present depression has about spent its force, and an upturn in business lies not far ahead."

applicable to all types of Norton wheels, organic (shellac, Bakelite, rubber) wheel grades are now designated in the same manner as vitrified wheel grades; that is, by a letter instead of a number. The letter substitutes for the old organic-bond grade numbers are as follows:

$\frac{1}{2}$	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	4	5	6	7	8	9	10
H	I	J	K	L	M	N	O	P	Q	R	S	T

Thus, 3846-M means No. 38 alundum abrasive, 46 grain size, M grade.

The fourth symbol is a numeral which designates the structure of the wheel. This new symbol takes the place of former meaningless markings, such as the D in 36-DQ and the T in 14-T8.

Because the abrasive content of a wheel is the chief factor in determining its structure, the symbol for structure is a key number representing the relative amount of abrasive in the wheel. Number 0 represents the highest abrasive content and number 12 the lowest abrasive content.

The fifth and concluding symbol in the new wheel marking is a letter designating the kind of bond, as follows:

Standard vitrified	.....	(Blank)
Vitrified bond	.....	B
Silicate bond	.....	S
Shellac bond	.....	L
Bakelite bond	.....	T
Rubber bond	.....	R

Thus, 3846-M5B means No. 38 alundum abrasive, 46 grain size, M grade, 5 structure, B vitrified bond; 16-P2T means regular alundum abrasive, 16 grain size, P grade, 2 structure, bakelite bond; 3736-N3T means crystolon abrasive, 36 grain size, N grade, 3 structure, Bakelite bond.

Putting Question Mark to Work

(Concluded from page 610)

sion "show me." At any rate, Mr. A. A. Kramer, president of that company, puts the question mark to the word depression itself. So far as his company is concerned, there has not been one! In closing this round table, I am going to ask him to tell us why.

Mr. Kramer: "For the past year, just closed, our company has never enjoyed a better condition. Each month has been more profitable than the corresponding months of other years. This result has been brought about without the reduction of salaries or wages. The reasons for this are as follows: Close study and analysis of each order; more intensive criticism of workmanship; further reduction of inventories; executive analysis and criticism of purchase requisitions. Last, and most important has been the intensive executive contact with our customers, the prompt and proper acknowledgment of their favors and the constant endeavor to do something constructive in the interest of our patrons."

In concluding this round table, and after hearing the opinions and experiences of the gentlemen who participated in it, I think we will all agree upon three things. First, that the question mark is being effectively used to disclose the possibilities of new economies; second, that this intensive study will introduce new standards of manufacturing efficiency during the coming months, and third, that if we are going to compete successfully with those who are putting their operations on this higher level, we shall all have to put the question mark to work if we have not done so.

THE IRON AGE

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See You at Chicago

H EAT treatment holds the center of the stage in this issue, for this is our special A. S. S. T. pre-convention number. As you know, the convention begins in Chicago on Sept. 22. By the way, if you are going to Chicago, please accept this as a cordial invitation to visit us at our booth, which is No. 2-B. Take a paper cup of water, a cigar and rest yourself. Freedom from selling talk is guaranteed.

Five of six IRON AGE editors will attend the convention, as usual. Depend upon their keen eyes, sensitive ears and ever-ready pencils not to miss anything that you will want to know about. For comprehensive reports, watch the issues immediately following the convention.—A. H. D.



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IRON AGE PUBLISHING CO.
239 West 39th Street,
New York, N. Y.

Cable Address: "Ironage, N. Y."

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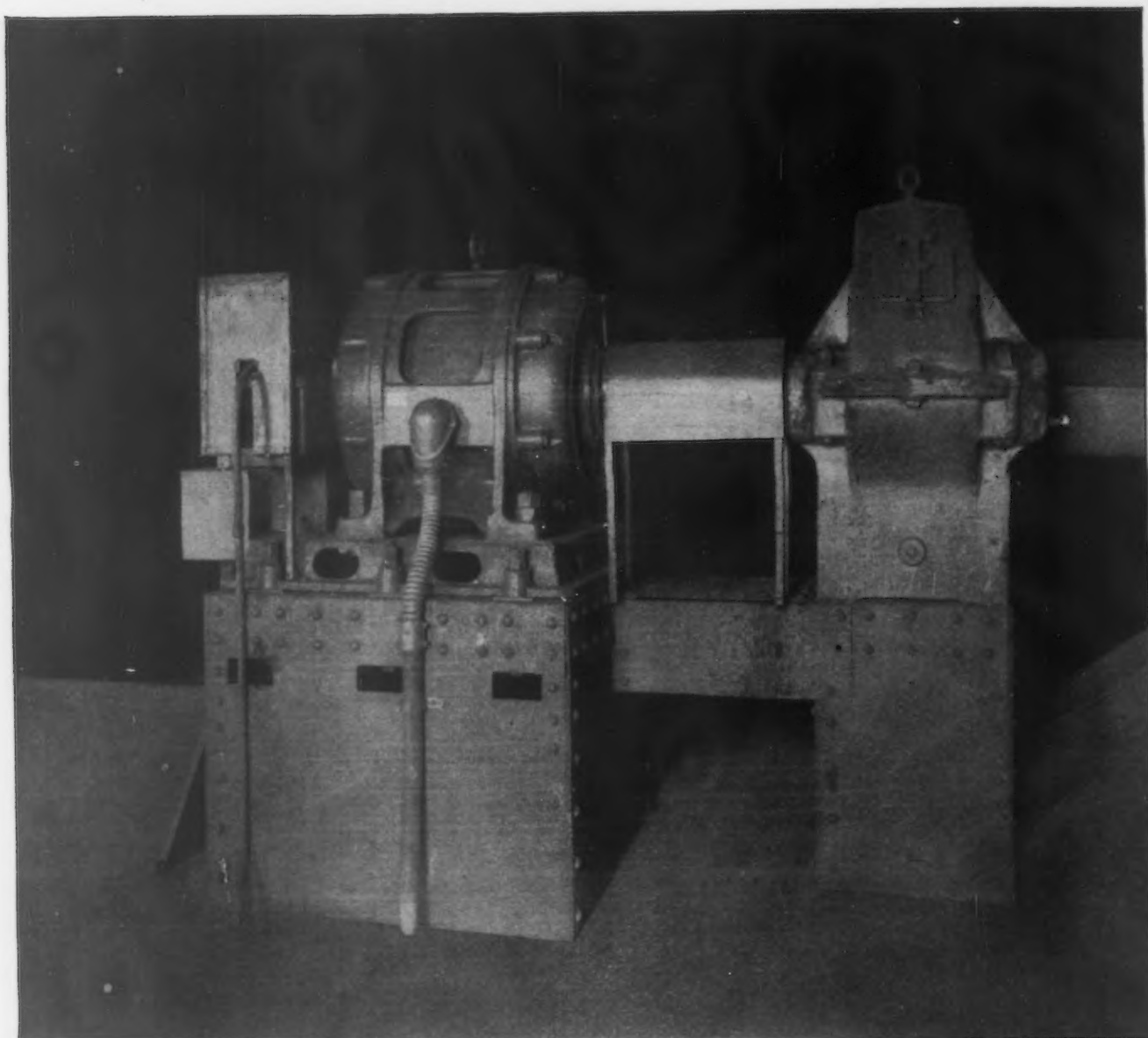
UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

District Offices:

CHICAGO, Otis Building
PITTSBURGH, 1319 Park Building
CLEVELAND, 1362 Hanna Building
PHILADELPHIA, 1402 Widener Bldg.
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IRON AGE PUBLISHING CO.
Member, Audit Bureau of Circulations
Member, Associated Business Papers
Published every Thursday. Sub-
scription Price: United States and
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NEW DEPARTURE BALL BEARINGS

THE IRON AGE

New York, September 11, 1930

ESTABLISHED 1855

VOL. 126, No. 11

What Heat Treatment Has Done for Aircraft Engine Parts

By R. R. MOORE

*Metallurgist, Wright Aeronautical Corporation,
Paterson, N. J.*

THE problem of building reliable aircraft engines is made especially difficult by the severe performance requirements of the engine and the necessity of building to a minimum weight. In the endeavor to keep the weight of the engine low, severe demands of strength and endurance are made on the materials employed in constructing these engines.

Extraordinary improvement in the physical properties of metallic alloys, made possible by the process of heat treatment, has contributed in large part to the successful development of the present aircraft engines. If we were to be suddenly deprived of the advantages obtained by heat treatment, it would be impossible to produce the performance and reliability now obtained in these engines. Heat treatment not only serves to increase the strength of alloys but develops uniformity and reliability.

Heat treatment of alloys of aluminum is a relatively recent development, nevertheless, it is re-

HALF of the weight of aircraft engines is represented by aluminum alloys.

¶ One alloy's tensile strength increased 65 per cent, with elongation tripled, by heat treatment.

¶ Short-cut heat treatments usually lead to inferior properties.

¶ Importance of artificial aging should be clearly recognized.

¶ Overheating of aluminum alloys slightly above the solution temperature will cause deterioration.

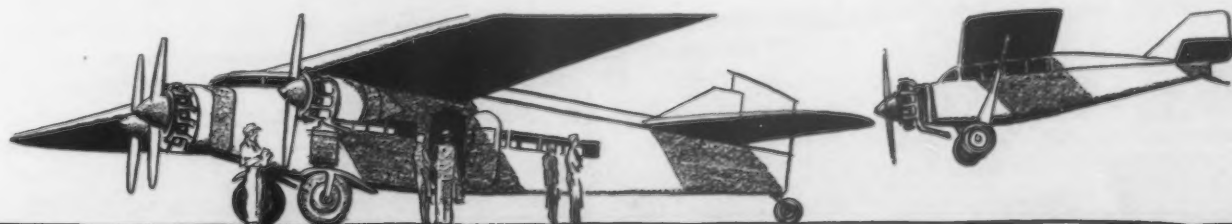
¶ Much attention has been directed to heat treatments that will produce improved machinability.

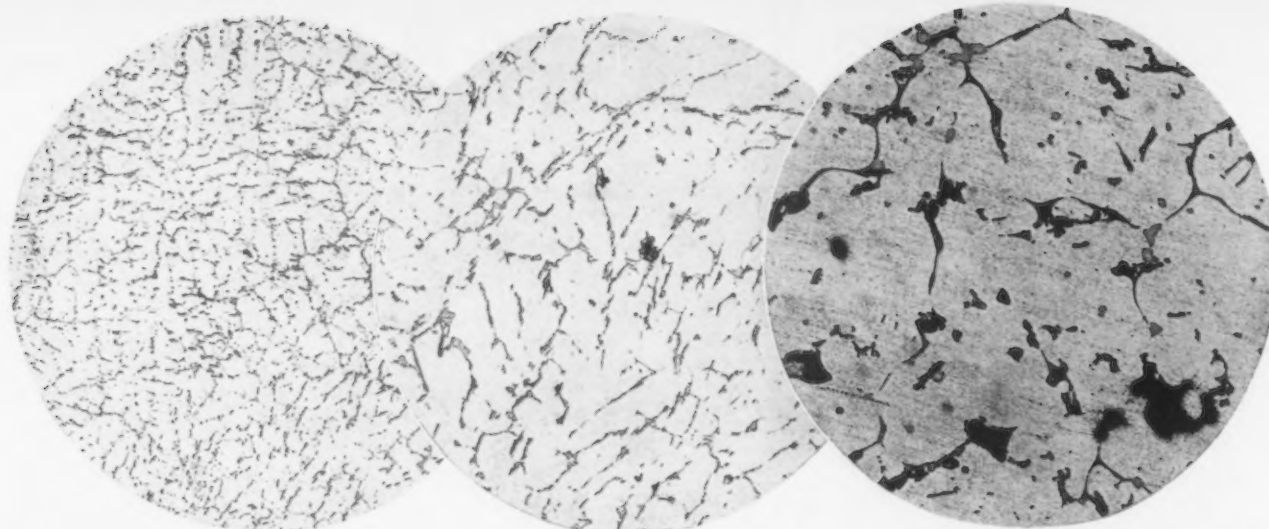
sponsible for much of the development of the aircraft engine. The improvement of such alloys by heat treatment is based primarily on the fact that certain elements and compounds have greater solid solubility in aluminum at elevated temperatures than at room temperatures. From this has resulted a technique of heat treatment which has greatly improved the properties of aluminum alloys.

Two Stages in the Heat Treatment of Aluminum Alloys

The heat treatment process is divided into two stages similar to the quenching and

drawing of steel but these stages perform different functions. The two stages are known as the solution treatment and the aging treatment. In the solution treatment the alloy is soaked for a sufficient length of time to put the hardening constituents in solid solution. When this has been accomplished, the alloy is quenched in water or other cooling medium, depending upon the desired results. The material does not obtain its maximum strength immediately as is the case





Photomicrographs show structure of Y alloy, as cast, quenched from the solution temperature, and overheated (left to right)

with quenched steel but increases in strength and hardness with time. This phenomenon is known as aging and is the second stage in the heat treatment of aluminum alloys. Aging can be hastened by heating to relatively low temperatures (250 to 450 deg. Fahr.) for shorter periods of time, this procedure being known as artificial aging. The technique of heat treating aluminum alloys depends upon the accurate control of the solution temperature, the time at this temperature, and the time and temperature of aging.

Advantages gained by heat treating aluminum alloys has resulted in their displacing the heavy bronzes, iron, and steels until at the present time about 50 per cent of the weight of the best aircraft engines consists of aluminum alloys. Since aluminum has approximately one-third the specific gravity of steel, this weight represents considerable bulk of the engine. In one illustration is shown a crankcase, a cylinder assembly, which consists of an aluminum head on a steel sleeve, and an aluminum piston. It is evi-

dent that these parts do not carry much excess material. Such light constructions are made possible by the excellent physical properties developed after heat treatment.

Heat-Treating Results Affected by Small Variations in Chemical Composition

The improvement in properties obtained by heat treating some of the light alloys used in aircraft engine construction is shown in the table. Values given in this table are quite general. The results obtainable by heat treatment are very readily effected by small variations in chemical composition. The optimum values can only be obtained by very accurate control of composition and heat treatment. It will be noted that the tensile strength of the 195 alloy may be increased 65 per cent accompanied by an increase of 200 per cent in elongation. Due to these improved properties and the low density of this alloy it has replaced bronze and cast iron for numerous cast parts.

Where resistance to elevated temperatures is de-

TABLE SHOWING IMPROVEMENT OF LIGHT ALLOYS BY HEAT TREATMENT

Alloy	Tensile Strength, as Cast, Lb. per Sq. In.	Elongation as Cast, Per Cent	Tensile Strength, Heat Treated, Lb. per Sq. In.	Elongation, Heat Treated, Per Cent	Improvement in Tensile Strength, Per Cent	Improvement in Elongation, Per Cent	Use
Alco 195.....	19,000 to 23,000	2 to 4	28,000 to 38,000	6 to 12	47 to 65	200	Crankcases, rocker boxes, etc.
"Y" Alloy.....	23,000	0	30,000	—	30.4	—	Pistons and cylinder heads
Alco 122.....	22,000 to 30,000	0 to 1	30,000 to 40,000	0 to 1	36	—	Cylinder heads
Alco 122 (permanent mold)....	30,000	—	38,000	—	26.7	—	Pistons
	(as rolled)	(as rolled)					
Duralumin	43,000	4	60,000	19	39.5	375	Connecting rods
Mg-Al Alloy.....	22,000 to 27,000	5 to 7	30,000 to 38,000	8 to 15	36 to 41	60 to 114	Crankcase rear end. Housings

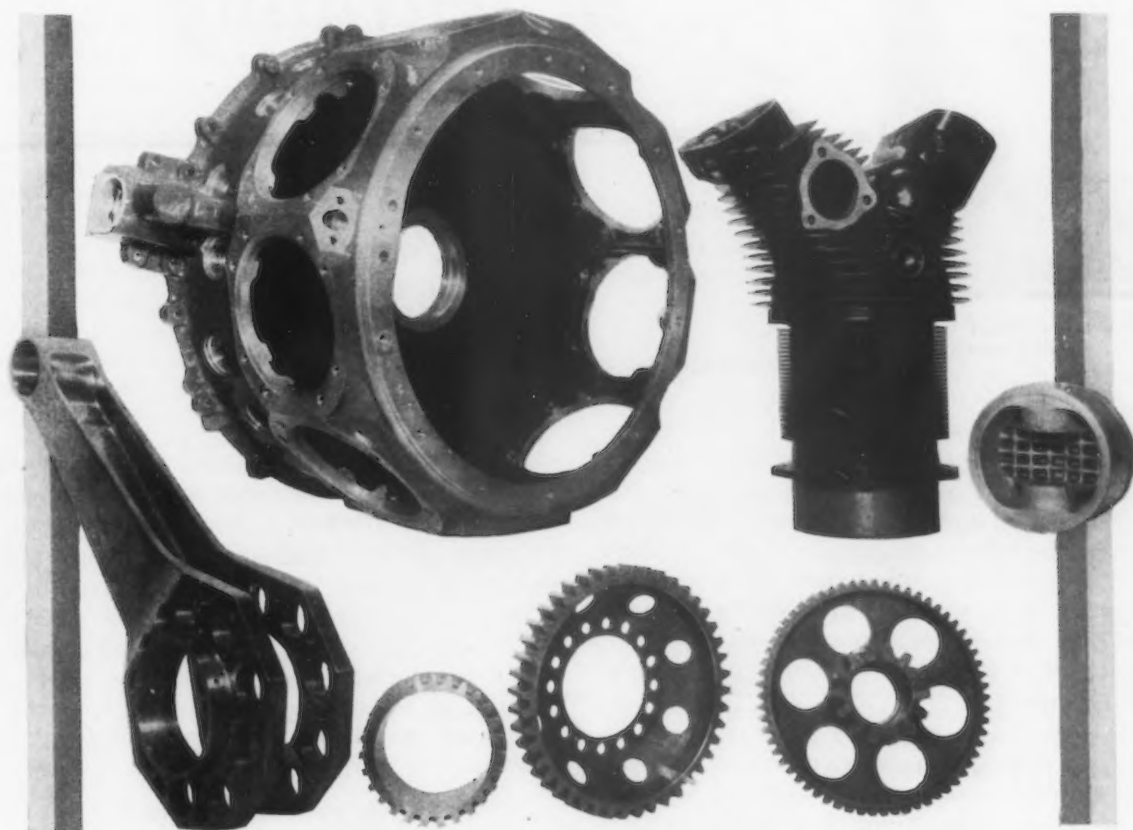
COMPOSITION OF THE ALLOYS IN THE TABLE

	Aluminum, Per Cent	Copper, Per Cent	Silicon, Per Cent	Magnesium, Per Cent	Manganese, Per Cent	Nickel, Per Cent	Iron, Per Cent
Alco 195.....	Rem.	4.5	0.85	—	—	—	0.85 max.
"Y" Alloy.....	Rem.	4.0	1.50	—	—	2.0	—
Alco 122.....	Rem.	10.0	—	0.25	—	—	1.25
Duralumin	Rem.	4.0	—	0.50	0.70	—	—
Mg-Al Alloy.....	4.0	—	—	Rem.	0.4	—	—

sired such as is required for cylinder heads and pistons, the alloys designated as "Y" and "Alco 122" are most commonly used. The improvement in strength of "Y" alloy and "Alco 122" by heat treatment has helped to replace cast iron for pistons. Again the heat treatment of wrought duralumin has developed in this light alloy the strength of mild steel and given to it considerable ductility. For this reason it has been able in certain instances to replace steel for connecting rods.

Since the introduction of duralumin, several other

at the solution temperature and sufficient time for aging at moderate temperatures. Short-cut heat treatments usually lead to inferior properties. This is particularly true when heat treating heavy sections. Thin sections develop their full strength and hardness in a shorter aging time than heavy sections. Aging time should, therefore, be proportioned to the heaviest sections to be treated. The successful heat treatment of aluminum alloy castings requires a nice adjustment of time and temperature. In general it is more satisfactory to age at lower temperatures for longer peri-



Crankcase, cylinder assembly and the piston are aluminum castings. The master rod and gears, of steel, have been whittled out until they are almost skeletons

wrought alloys, namely Aluminum company's No. 51S and 25S, have been developed. They also will respond to heat treatment, showing considerable improvement in physical properties, and are used in the wrought form for crankcases, connecting rods, propeller blades and other miscellaneous parts.

In heat treating duralumin, desirable properties may be obtained by quenching in oil, air, warm water or cold water. Each of these treatments is adaptable to certain uses. The cold water treatment is undesirable on extremely thin complicated sections or in the presence of sharp corners and notches, but on the other hand it is of considerable value in minimizing the susceptibility of duralumin to sea water corrosion. To increase the resistance of duralumin to such corrosive action it should be quenched in cold water and aged at room temperature. Quenching in hot water, oil, or air and aging above 200 deg. Fahr. results in considerable less resistance to corrosion.

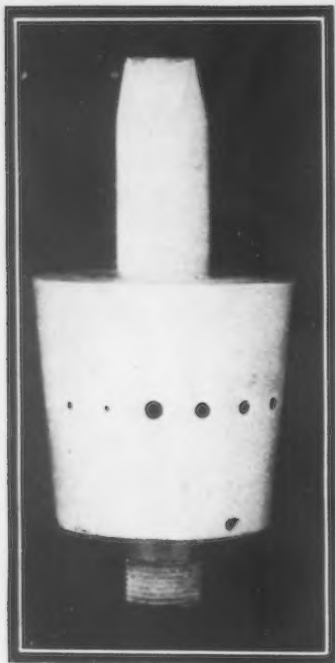
The best results in heat treating aluminum alloys are obtained by allowing sufficient time for soaking

ods of time as better physical properties are obtained.

Importance of artificial aging treatments should be clearly recognized. It has been found that some aluminum alloys will continue to age at room temperature over a considerable period of time, which may be as long as two or three years. Therefore, engine parts that have been aged at or near room temperature are not in a permanent or stable condition when assembled in the engine. This condition, of course, is undesirable. It can be best overcome by artificial aging, which consists of heating to a moderately elevated temperature for a certain period of time. The temperature and time necessary depend upon the alloy, the heat treatment and the function of the part and must be carefully worked out and definite methods of control set up.

Complete aging not only produces a maximum tensile strength but develops considerable increase in proportional limit, in fact proportional limit increases more rapidly with aging than the tensile strength.

(Concluded on page 757)



A nitrided valve of 0.20 to 0.30 per cent carbon nitriding steel.

Recent Developments in Nitriding

By R. SERGESON

*Metallurgist, Republic Steel Corporation,
Canton, Ohio*

DURING the past year in this country the nitriding steels have been given considerable publicity and in turn have been experimented with in almost innumerable applications. In most of these the nitrided parts have proved their merit although their selection as a standard specification in many cases has been delayed for economic reasons. Other experiments failed due either to misapplication or to improper processing.

It is thought that a discussion of several applications will give the reader a clearer picture of the part which the nitriding steels are now fulfilling and will play in the future. First, however, a table of various types of nitriding steels, now to be obtained on the commercial market, is herewith given.

These steels are capable of being heat-treated to develop high physical properties. The latter, however, have been published many times, hence will be omitted in this discussion. It is recommended that these steels always be used in the heat-treated condition wherever practical.

Preliminary Preparation of Steel Parts for Nitriding

Parts made from these nitriding steels should be machined from heat-treated bar stock. If, however, parts are made from large forgings, it is best to first normalize the forging (air cool) from 1700 to 1750 deg. Fahr. and follow with the usual heat treatment which generally consists of quenching from 1700 to 1750 deg. Fahr. and drawing to the desired hardness. Small forgings which are finished with fine grain may be heat-treated di-

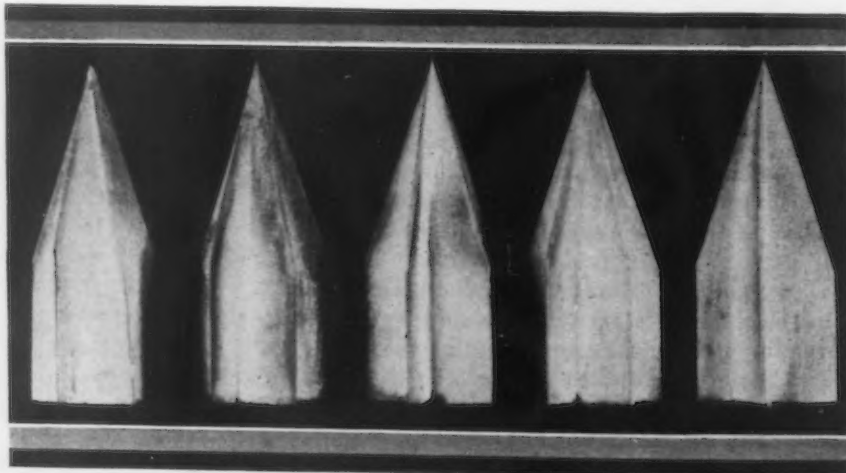
rectly, omitting the normalizing treatment. Any attempt to nitride an annealed or normalized structure results in a brittle part.

After the heat treating, the parts are fully machined and nitrided. Where warpage must be held to a minimum, a draw reheating to 1000 to 1100 deg. Fahr. should be inserted between the rough machining and finish machining operations. The object of this latter draw is to relieve the strains set up in the rough machining operation. Hence on nitriding there is practically no warpage or distortion.

Nitrided Parts Are Lasting Longer

On solid sections a growth of 0.001 in. to 0.003 in. in diameter takes place, depending upon the length of time in nitriding. The growth is uniform, yet for thin walled sections it is best to determine by experiment the amount of stock to be allowed for in final grinding operation.

In the company with which the writer is associated,



Nitrided hard rubber finger reamers of 0.30 to 0.40 per cent carbon nitriding steel

the nitriding steels have been placed in many and varied applications throughout its plants with the view of determining their adaptability. Some of these will now be considered:

1. Valves are used to inject tar into the open-hearth furnace. The type and construction of the valve is shown in an illustration. Previous valves made of cast iron or steel gave from two to three months' service before openings would wear oval, thus changing the fuel consumption and accuracy of control. The nitrided valves have been in service now 10 months and are still in excellent condition. Thus in this application the nitrided surface resists both erosion and corrosion.

2. Link motion pins and bushings of the Walschaert valve gear on a locomotive working at the blast furnace division were made of nitrided 0.20 to 0.30 per cent carbon nitriding steel. Due to the dust and grit present in the air, the brass bushings previously used were replaced every four months. To date the nitrided pins and bushings have been in service 20 months and show only slight signs of wear. This application calls for resistance to abrasion.

3. A certain hydraulic pump cam operating in water when made of carburized steel lasted on the average seven weeks. This was replaced with nitrided 0.30 to 0.40 per cent carbon nitriding steel and has given four months service to date and is still in operation. This application shows the nitrided case is capable of not only withstanding wear and corrosion but able to withstand a certain amount of impact.

4. Shafting and bushings for Medart straightening machines made from nitrided 0.30 to 0.40 per cent carbon grade, wearing plates on sheet mill shears, sheet mill roller leveler rolls, steam valves, etc., have all given exceptional service.

EXPERIENCE with nitrided parts in various applications and services has shown exceptional results.

¶ Nitrided surfaces resist erosion, corrosion and abrasion in demonstrated service.

¶ That a lower cost for nitriding will be effected in the near future is indicated by recent developments in furnaces and nitriding containers.

¶ By adding sulphur to the nitriding steels, a freer machining process has been made possible, increasing the applicability of nitrided products.

¶ A special mixture has been developed for conveniently protecting portions of the part from the nitriding operation.

While the nitriding steels compete chiefly with the carburizing analysis, there are many other fields open.

Finger reamers made of 0.30 to 0.40 per cent carbon nitriding steel nitrided are shown in an illustration. These are used to ream hard rubber. In service, they produced twice the amount of work with half the necessary regrindings when compared with reamers made from high-speed steel.

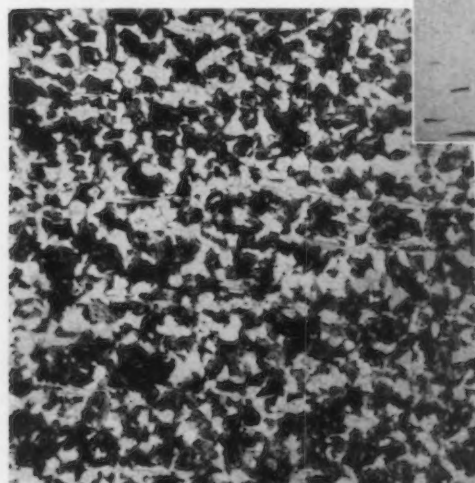
A connecting rod die insert made from 0.55 to 0.65 per cent carbon nitriding steel is represented by one of the illustrations. This type of die, where impression is shallow, has given excellent service in use in drop forging work where forgings must be held within narrow weight limits. Upsetting die inserts,

and in fact rivet sets for hot riveting, are being used with much success.

In France the nitriding steels are a standard specification for a number of automotive and aviation parts, e. g., crankshafts, camshafts, wrist pins, ring gears, cylinders, etc., are made from 0.40 per cent carbon type. These parts have already been used and proved in this country, although not on a large scale.

Recent developments in furnaces and nitriding containers indicate that a lower cost of nitriding will be effected in the near future, thus allowing for greater production.

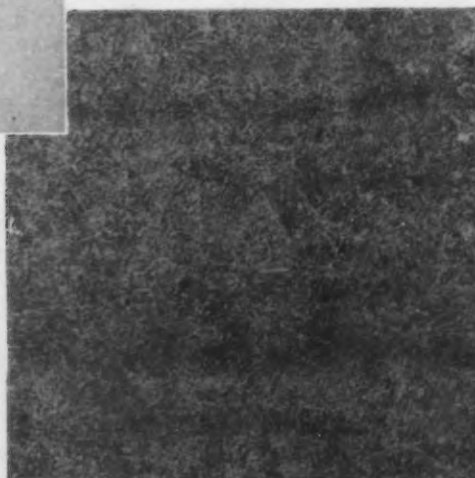
Large sections made from the nitriding steels are proving successful. Large piston rods for gas engines are showing excellent results. The writer has in mind one such, 5½ in. dia. by 11 ft. long, which has operated six months to date and a slightly smaller



High-sulphur nitriding steel, showing uniform distribution of sulphide inclusions. Unetched at 100 dia. (Above)

High-sulphur nitriding steel as rolled. Etched in nitric acid, 100 dia. (at Left)

High-sulphur nitriding steel heat-treated. Etched in nitric acid, 100 dia. (at Right)



one that has been in service one year. These rods are water cooled and must resist water corrosion, which the nitrided surface does. Locomotive cross-head guides are also proving successful in service.

From the above applications it can be seen that the nitrided steels are called upon for varied services demanding one or more of the following properties characteristic of the nitrided case:

1. High hardness and high resistance to abrasion.
2. Corrosion resistance to oils, weather, water, alkali, gasoline, salt spray, etc. (no resistance to mineral acids is claimed).
3. Retention of high surface hardness when heated to red heat, e. g., dies.
4. Obtaining of these properties without warpage of part, e. g., intricate sections.

Free Machining Nitriding Steel Now Possible

Until the past few months the nitriding steels have been at a disadvantage with respect to machining when competing against the carburizing grades. The fact that nitriding steels were required to be in the sorbitic condition for best nitriding qualities means increased machining cost. This increased cost has in some instances prevented it from replacing the carburizing steel.

Investigation of a number of special heats, made in the laboratory, were conducted to determine the effect of sulphur additions to the nitriding analysis. Excellent results were obtained. A heat was then made under mill operating conditions. This heat rolled and forged readily. It gave satisfactory nitriding qualities with respect to hardness and corrosion. Heat-treated tensile and impact values were found to compare very favorably with the regular nitriding steels of like carbon content. The group of photomicrographs shows the even distribution of the sulphide sonims, the as-rolled structure of a 1 9/16-in. rd. and the heat-treated structure.

M a c h i n a-
bility tests were conducted comparing this high-sulphur with the regular nitriding steel. Tests were conducted in the hardness ranges from 340 to 197 Brinell. At all

hardness values the high-sulphur heat was unquestionably far superior.

The ease with which the high-sulphur type machined is demonstrated by tests which showed that, with a spindle speed of 104 r.p.m. and a cut of 1/4 in., the resulting chips or cuts were spiral whether with a carriage feed of 48 in., 40 in. or 32 in. per min., whereas in the ordinary nitralloy the spirals all tore. The composition of the two steels is as follows:

	C	Mn	Al	Cr	Mo	S
Regular	0.34	0.52	0.95	1.14	0.20	0.02
High Sulphur	0.37	0.58	1.06	1.07	0.19	0.146

Protection from Nitriding

Where machining is to be accomplished after nitriding, tinning offers the best protection. Often, however, it is required merely to keep parts relatively soft, e.g., threaded sections. For this purpose, the following mixture has been developed in the laboratory and applied in practice with success:

One part water glass (sodium silicate) by volume.
Two parts chrome ore (150 mesh) by volume.

This mixture is freshly mixed and painted on sections desired to be kept soft. It is allowed to dry 4 to 5 hr. before the part is placed in the nitriding container. Impact tests were conducted in the coated and uncoated condition to determine the effectiveness of the protection. Values obtained show 70 ft. lb. for coated specimen to 40 ft. lb. for the uncoated specimen. The coated specimen could be filed and showed but little increase in surface hardness. A wire brush may be used to remove the coating.

In this article the types of nitriding analyses now found on the commercial market have been discussed as to many applications in industry.

A new free machining high-sulphur nitriding steel is reviewed as to its machinability and nitriding

qualities compared to the regular nitriding analysis.

A convenient method of protection against nitriding with a sodium silicate, chrome ore mixture is outlined.



Nitrided connecting rod die insert 0.55 to 0.65 per cent carbon nitriding steel

COMPOSITION OF THE NITRIDING STEELS NOW USED

Carbon, Per Cent	Manganese, Per Cent	Chromium, Per Cent	Aluminum, Per Cent	Molybdenum, Per Cent
0.10 to 0.20	0.40 to 0.70	0.80 to 1.30	0.60 to 1.20	0.15 to 0.25
0.20 to 0.30	0.40 to 0.70	0.80 to 1.30	0.60 to 1.20	0.15 to 0.25
0.30 to 0.40	0.40 to 0.70	0.80 to 1.30	0.60 to 1.20	0.15 to 0.25
0.55 to 0.65	0.40 to 0.70	0.80 to 1.30	0.60 to 1.20	0.15 to 0.25

Heat-Treating Furnaces Become Production Machines

By ROBERT M. KEENEY

THE heat-treating furnace is no longer a simple equipment for the application of heat to the work to be heat treated, but is rapidly becoming a production machine handling material in the furnace with about as much ease as any labor-saving device operating at room temperature. It is following the trend of our mechanical age with heavy loads and light loads moved with equal facility and with the rate of production automatically controlled just as are liberation of heat and temperature.

Improvement in furnace design has not, however, been confined to continuous furnaces, as batch furnaces are now built with much greater attention given to uniformity of heating and efficiency, and are usually equipped with automatic control. The changing trend is not simply the result of a more careful application of the fundamentals of heating for heat treatment, and of the use of greater mechanical engineering knowledge in material

HANDLING material in the furnace with about as much ease as any labor-saving device operating at room temperature, the heat-treating furnace is becoming a production machine.

Continuous furnaces are being rapidly applied to a wide variety of operations in production heating.

Heat-resisting alloys have made available satisfactory conveyors for continuous furnaces.

Widespread interest exists in the continuous annealing of metals in strips.

Atmospheric control in heat-treating furnaces is realized as of growing importance.

Improved working conditions in heat-treating plants have been found to pay.

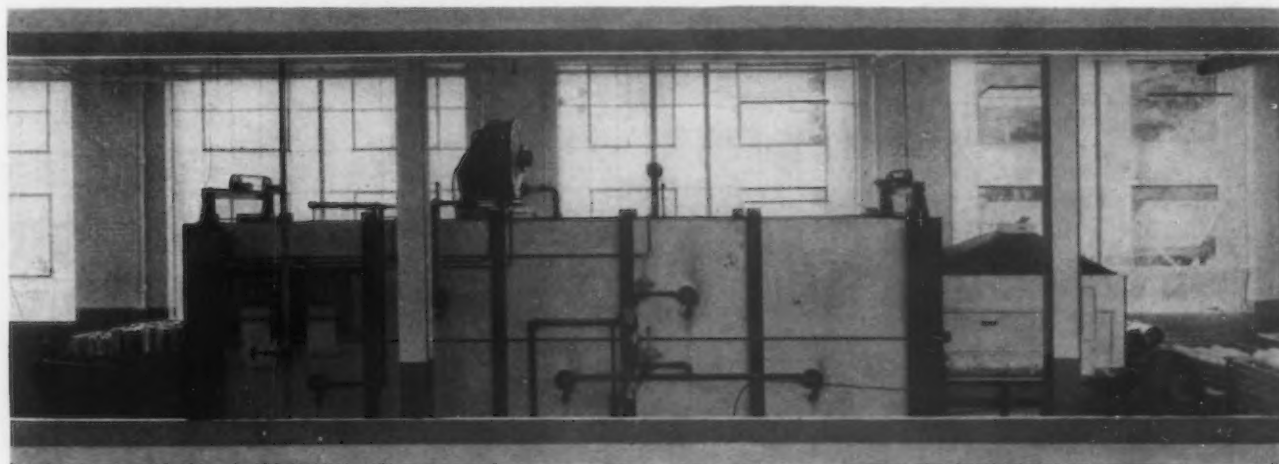
The problem in heat treatment is quality production at a low over-all cost of the finished product.

handling, but is coming about because the industrial user of the equipment realizes the great economic benefits possible with a production heating machine available instead of a furnace. The frame of mind of the buyer is changing in that, if value is given, he is willing to pay for it, a condition not existing with reference to heat-treating equipment a few years ago.

Continuous Conveyor Furnace Developing Rapidly

THE continuous form of furnace is being rapidly applied to a wide variety of operations in production heat treating. This trend has been very decided

during the past year. Improved heat-resisting alloys, used with great skill by furnace designers, have accelerated its development to a degree that did not seem probable a few years back, when the suggestion of continuous furnaces other than the pusher type, the rotating drum type and the rotating hearth type for temperatures above 1400 deg. Fahr. was inviting



Atmospheric control with spray quenching produces non-oxidizing anneal of non-ferrous shells in Ryan, Scully & Co. gas-fired continuous conveyor furnace

trouble and high maintenance expense. Today continuous furnaces of the conveyor type are available for hardening and annealing at temperatures up to 1600 deg. Fahr., not only for capacities as large as 1500 lb. per hr., but also in small sizes, as low as 300 lb. per hr. They have been standardized and listed just as batch type furnaces. Most of the conveyor furnaces now installed are heated with gas or electricity, although recently oil-fired furnaces of a similar type have been built.

Many types of pusher furnaces have been developed, with improved pusher mechanism. Oil, gas and electricity are all used for heating pusher furnaces with the fuels being applied possibly more extensively than electricity. The roller hearth furnace has been further developed, and standardized with most installations electrically heated.

The walking beam motion for movement of work through a furnace has been applied successfully to a number of large normalizing and annealing operations at temperatures considerably above 1400 deg. Fahr., considered its limit until heat-resisting alloys were used in construction of the mechanism. It has proved very satisfactory for the normalizing of steel sheets for the automobile industry, when fired with natural gas.

Increasing demand for continuous furnaces arises not only from the improvement in their construction and from the labor saving possible with mechanical handling of material, but also because of a more definite realization of the greater probability of production of a uniformly heated product, with uniformity of heat application to the individual piece, rate of heating and time at temperature all under automatic control as determined by the supervising metallurgical staff of the plant.

As with any new development, there exist various opinions as to the best type of conveyor. The first furnaces were built with a strip alloy belt, which did not seem to have a satisfactory life. The strip alloy belt has been followed by the wire mesh alloy belt, the cast link alloy belt, and recently a link belt made up of formed and welded alloy strips.

Types of Conveyors Reviewed

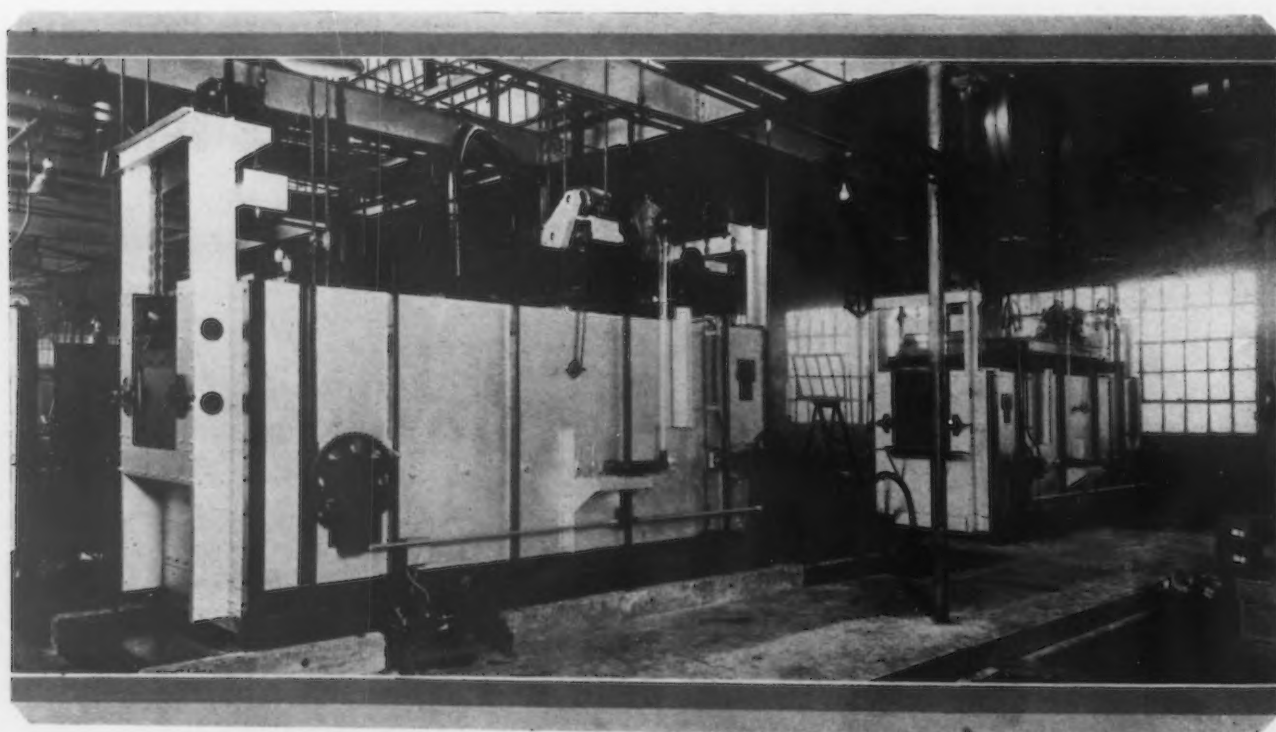
Each of these belts has its field. The wire mesh belt seems well adapted to furnaces of moderate capacity and length, carrying moderate loads. It averages a much longer life than the strip alloy belt, and is light in weight. The cast link alloy belt is rugged, but flexible, and will stand heavy loads. In some cases it has operated for as long as two years without failure. However, it is heavy. The formed and welded alloy strip belt is heavier than the mesh belt, but lighter than the cast link belt. The first installation has operated nine months regularly without interruption of service.

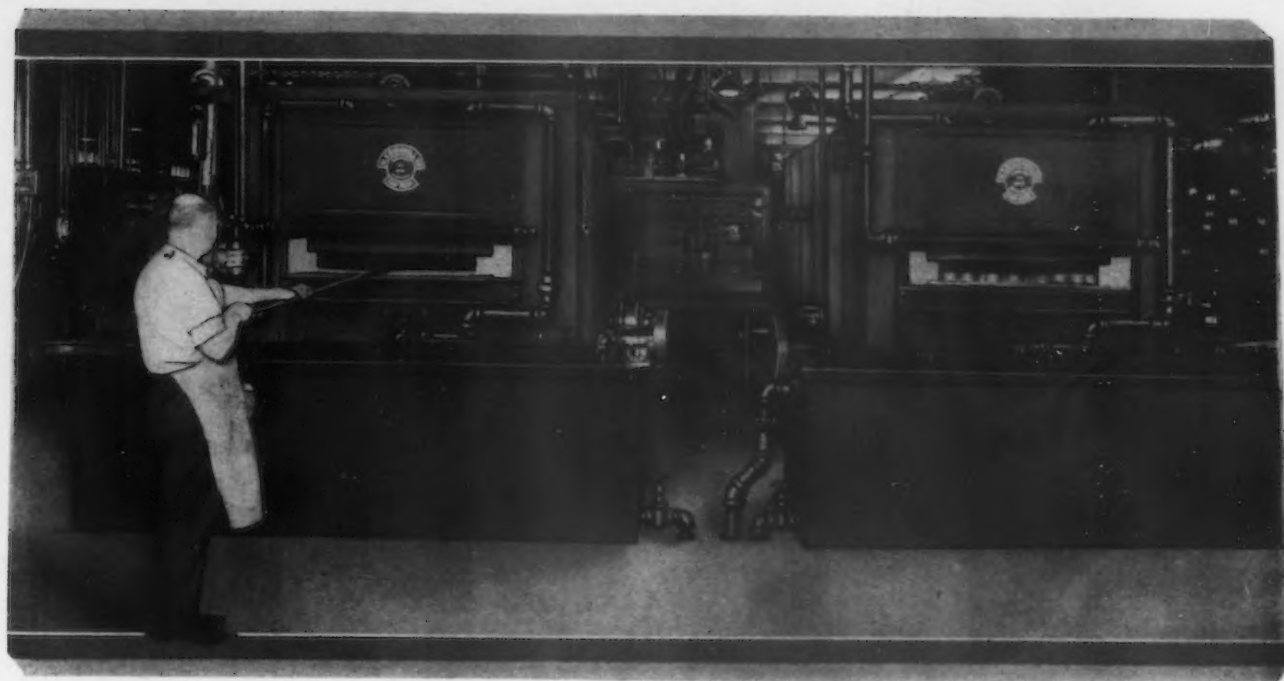
Continuous Strip Annealing of Much Interest

HEAT-RESISTING alloys have not only made available satisfactory conveyors for continuous furnaces, but also are essential in other parts of the furnace for hearth plates, supporting channels, rails, chutes, shafting and drums. The progress of the continuous conveyor furnace has been rapid during the past two years, but from a long pull standpoint, its development is probably still in its infancy.

Continuous annealing of metals in strips with suitable atmospheric control is commanding widespread interest at the present time among producers of sheet steel and sheet non-ferrous metals. On some metals a bright anneal is

Two Electric Furnace Co. continuous conveyor electric furnaces recently installed for the hardening of bearing races by Standard Steel & Bearings, Inc., at the Plainville, Conn., plant





TWO W. S. Rockwell Co. modern oil-fired box furnaces heat large races for hardening, in Plainville, Conn., plant of Standard Steel & Bearings, Inc.

obtained, and often where the product is not absolutely bright, the non-oxidized finish seems to make the process economical because of savings in subsequent manufacturing operations. Electricity tends to be the prevailing source of heat, due to its ease of application and the resulting low maintenance cost with the type of furnace at present developed.

Although a continuous furnace for the bright annealing of strip steel has been in operation for many years, first fired with gas, but for a number of years part electrically heated, the development of continuous furnaces for bright annealing has been retarded by lack of knowledge of the best method of securing and retaining the atmosphere necessary. The pack anneal has prevailed, with the cold-rolled steel manufacturer inquiring for continuous bright annealing equipment from time to time, and the furnace manufacturer ready to supply equipment, if the user would assume responsibility for the bright anneal, which is a problem of which the steel producer might be expected to have greater knowledge than the furnace engineer. Consideration of practice in production of cold-rolled strip indicates that the use of continuous bright annealing on the final process anneals may lead to changes in present practice tending to shorten very considerably the long time of material in process—a very important factor in a market where hand-to-mouth buying prevails.

Use of Electricity Logical

Under suitable local conditions, the use of electricity as the source of heat seems logical. It can be easily applied to the present type of furnace, which consists of a vertical furnace chamber carrying the heating elements on its walls and surrounding a vertical retort containing drums for carrying the strip, one at the top and two at the bottom. A suitable seal is provided on the incoming and outgoing sides and where quick cooling is not detrimental, a water seal

is used on the outgoing end.

As applied to some metals the equipment is still in the development stage as regards the best method of securing the correct rate of cooling and as to the proper atmosphere

for the metal being annealed. With fuel as the source of heat, the supplying of the correct atmosphere by control of the products of combustion does not appear to offer as great possibilities as providing a definite atmosphere from an external source.

A factor involved in consideration of the source of heat for a continuous bright annealing furnace is that where pack annealing has been necessary, the elimination of pots and cars, which usually are of greater weight than the product, and the shortening of the time cycle may permit the use of a more expensive source of heat of higher form value, with a heat cost no greater than formerly prevailed with a source of heat of lower form value. The source of heat, however, is a problem of the individual plant, with due consideration given to the stage of development of the application of oil, gas and electricity to continuous strip annealing furnaces.

Importance of Control of Atmosphere Now Realized

THERE is a growing realization of the importance of atmospheric control in heating for heat treatment in oil, gas and electric furnaces. Automatic temperature control is being successfully applied to oil-fired forging furnaces, and much attention is being devoted to the scaling action of the forging furnace. Further experience will probably show that scaling in heating for forging not only means a considerable loss of metal, but also is a strongly contributing factor to some of the undesirable qualities which may develop in the finished forging. Gas is being applied to heating for forging on a large scale in some localities. Oil and gas-fired annealing furnaces not only operate under close automatic control of temperature

(Continued on page 722)

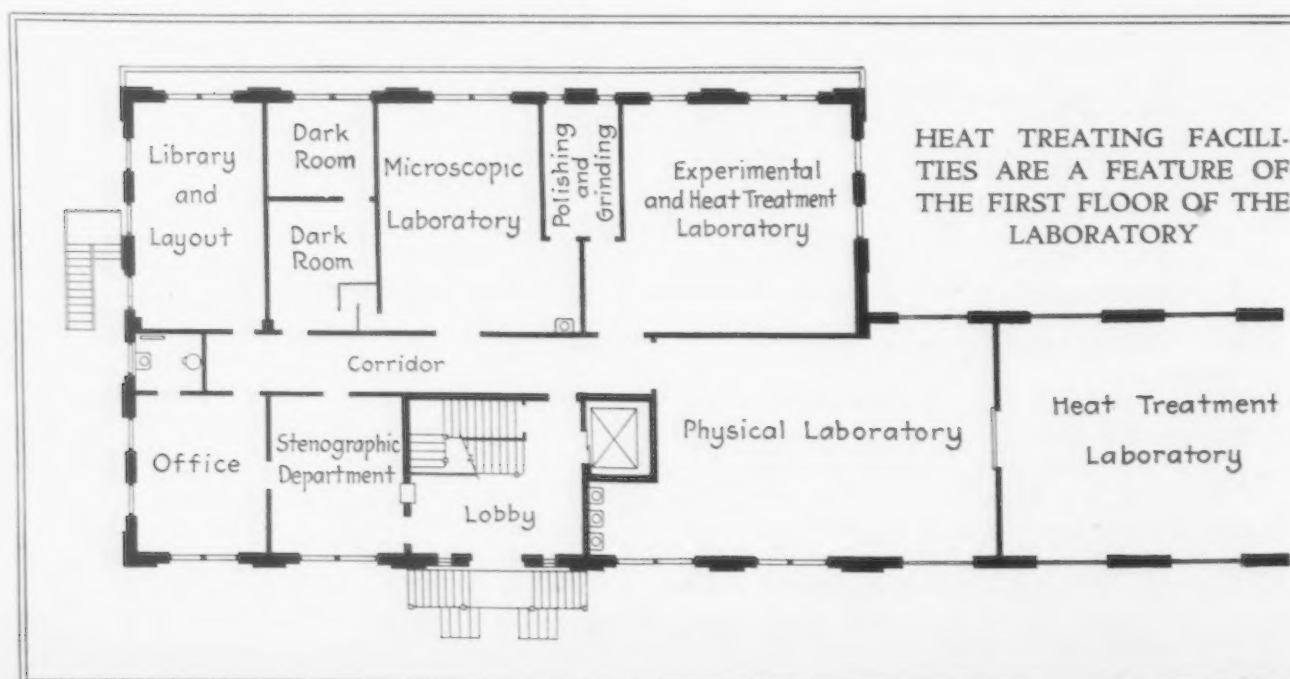


To Study Special Steels in New Research Laboratory

AN addition to the research laboratory of the Firth-Sterling Steel Co., McKeesport, Pa., which is nearing completion, has facilities for the production of special steels, their forging into tools of commercial size, and heat treating and testing under practical conditions without recourse to the mill at any time. The new unit, which is adjacent to the company's old laboratory, is a two-story brick and tile structure, 50 by 80 ft., and has been built for the accommodation of two additional floors as they may be needed. The construction of the building provides exceptional diversification of use, in view of the fact that the inside partitions are hollow tile, and walls may be torn down and built up in a few hours, thus enabling adjacent rooms to be thrown together or additional compartments added.

The older portion of the laboratory, consisting of a single-story brick building about 150 ft. long, contains a chemical laboratory making control analyses for the mill and a commercial heat treatment laboratory which has been extended in the new building. The new building contains on the first floor a physical testing laboratory equipped with tensile, impact, fatigue and hardness testing apparatus and has space reserved for an elementary machine room.

Adjacent to the physical testing laboratory is the experimental heat treatment laboratory which contains furnaces and precision heat-treating equipment. In this laboratory experimental steels will be heat treated under the most accurate temperature control prior to the fabrication of larger test pieces or commercial tools which will then be heat



▲ ▲ ▲

GREGORY J. COMSTOCK, who has been director of research for the Firth-Sterling Steel Co., McKeesport, Pa., since 1926, had general supervision of the design and erection of the new metallurgical laboratory. He was graduated from Sheffield Scientific School in 1917 and was first employed as metallurgist for the American Hardware Corporation, New Britain, Conn. He later went with the International Silver Co., Meriden, Conn., where he served as metallurgist and manager of Factory X, which was developed under Mr. Comstock's direction. During his association with the Firth-Sterling company, Mr. Comstock has been instrumental in the development of special steels. He has been one of the pioneer investigators of the uses of cemented tungsten-carbide tools, having visited England in this connection in 1927, and Germany in 1929. In his present capacity he is in charge of the second largest plant in the world for the manufacture of tungsten carbide, located in the company's research laboratory annex.

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GREGORY J. COMSTOCK

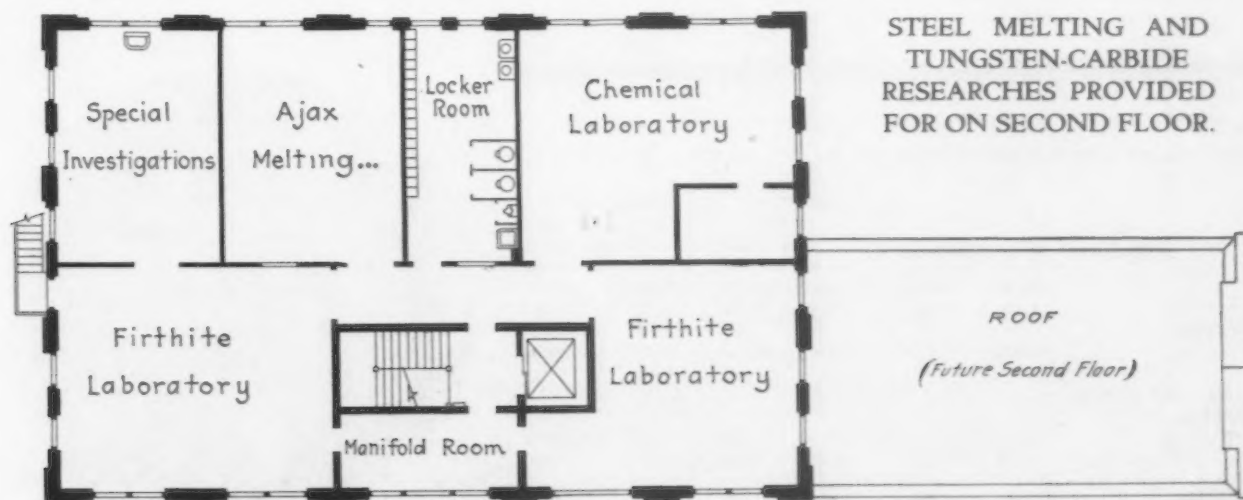
treated in the commercial heat-treating laboratory.

A metallographic grinding and polishing laboratory is placed between the experimental heat-treating laboratory and metallographic laboratory. In it is apparatus for polishing and etching metallographic specimens. The metallographic laboratory has been constructed in such a manner that it can be darkened and high magnifications obtained by projecting magnified images of specimens directly on a moving picture screen using a metallographic microscope as projector. There is an entrance to two dark rooms, one for plates and the other for prints, from the micro laboratory through a light lock of the Bathel type. On the first floor of the new laboratory is also a library and reception room in which it is proposed to project for guests and visitors moving pictures of the operations performed in the mill.

On the second floor there is a well-equipped chem-

ical laboratory which is to be used exclusively for research investigations; a laboratory where 30-lb. ingots of special steels can be produced in an Ajax high-frequency induction furnace; a special investigation laboratory which permits segregating special investigations when that seems advisable, and two tungsten-carbide research laboratories. Of the latter, the larger is to be used in the more abstract technical side of research on hard abrasive cutting materials while the other is of a semi-practical nature where processes for producing tungsten-carbide are constantly under observation.

All of the laboratories are supplied with compressed air at 90 lb., hydrogen, water, natural gas and alternating current and direct current electric power of both 110 and 220 volts. The laboratory was designed and construction supervised by United Engineers & Constructors, Inc., Philadelphia.





Regular (above) cast iron and alloy cast iron as cast. Etched with 1% nitric acid, 100 dia.

THE use of heat treatments in connection with steel has increased very rapidly during the past 15 years. What has been the development in connection with cast iron, steel's half brother, and what may we expect further?

Gray cast iron differs from steel largely in that it has flakes of graphite (free carbon) in its structure. It is this structural difference that accounts for its lack of ductility. Heat treatments are in use which will increase or decrease the ductility and strength of steel; but up to the present time no heat

Wider Use of for Gray

By H. BORNSTEIN

Chief Chemist and Metallurgist, Deere & Co.,
Moline, Ill.

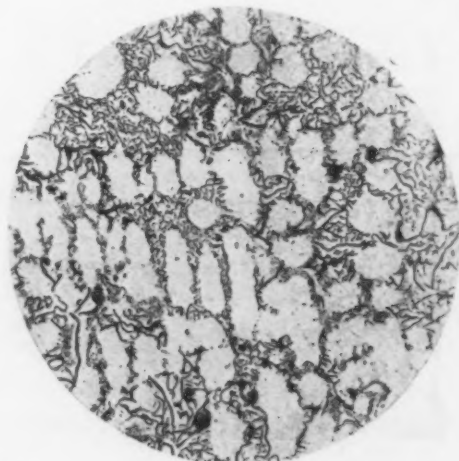
treatment has been devised which will give to gray iron castings an appreciable amount of ductility. The graphite flakes act as planes of weakness and interfere with the plastic flow of the material.

The commercial development of heat treatment of cast iron has been along the lines of increasing machinability and removing internal stresses. Heat treatments for these purposes have developed rapidly. The tonnage of castings (particularly in the automotive industry) subjected to heat treatment is quite large and many times what it was 15 years ago. We can expect this practice to spread. Many plants today are heat treating the major share of their gray iron castings.

Not much development has taken place commercially in the field of quenching and drawing cast

TABLE II—PHYSICAL PROPERTIES OF HEAT-TREATED CASTINGS

	As Cast		Quenched from 1450 Deg. Fahr.		Quenched from 1450 and Drawn at 800 Deg. Fahr.	
	Regular Iron	Alloy Iron	Regular Iron	Alloy Iron	Regular Iron	Alloy Iron
Tens. strength, lb. per sq. in.	35,320	38,580	40,600	46,320	41,780	47,400
Trans. test on 1.20-in. arbitration bar:						
Load, lb.	2,480	2,730	2,670	2,830	3,225	3,050
Defl., in.	0.29	0.28	0.31	0.34	0.35	0.33
Brinell hardness.....	217	228	340	387	302	364



Regular cast iron (left) and alloy cast iron, 1% nitric

Heat Treatment Iron Castings

DEVELOPMENT has been toward increasing machinability and removing internal stresses.

Three methods are being used—artificial aging, annealing to reduce hardness and increase machinability, and quenching to increase hardness and strength.

Increased production and longer tool life will more than compensate for the cost of heat treatment, such as annealing.

iron. The function of such treatments would be to increase hardness and strength. Many difficulties will be encountered in this development, but we may expect progress.

Three Classes of Heat Treatment in Use

Various heat treatments are used for gray iron castings, depending upon the results desired. These heat treatments may be divided into three classes:

1. Artificial aging, or to remove internal stresses and prevent distortion.
2. Annealing to reduce hardness and to increase machinability.
3. Quenching, or quenching and drawing, to increase hardness and strength.

Commercially, the first two classes are quite

important and represent a considerable volume of castings, while the product involved in the third class is relatively small.

There are certain classes of gray iron castings where the elimination of internal stresses is quite important. These stresses must be eliminated in order to prevent warpage after machining. A good example of this type of casting is an automobile piston. Practically all of the cast iron pistons used in the automotive industry are given a heat treatment to remove internal stresses. The range of tem-



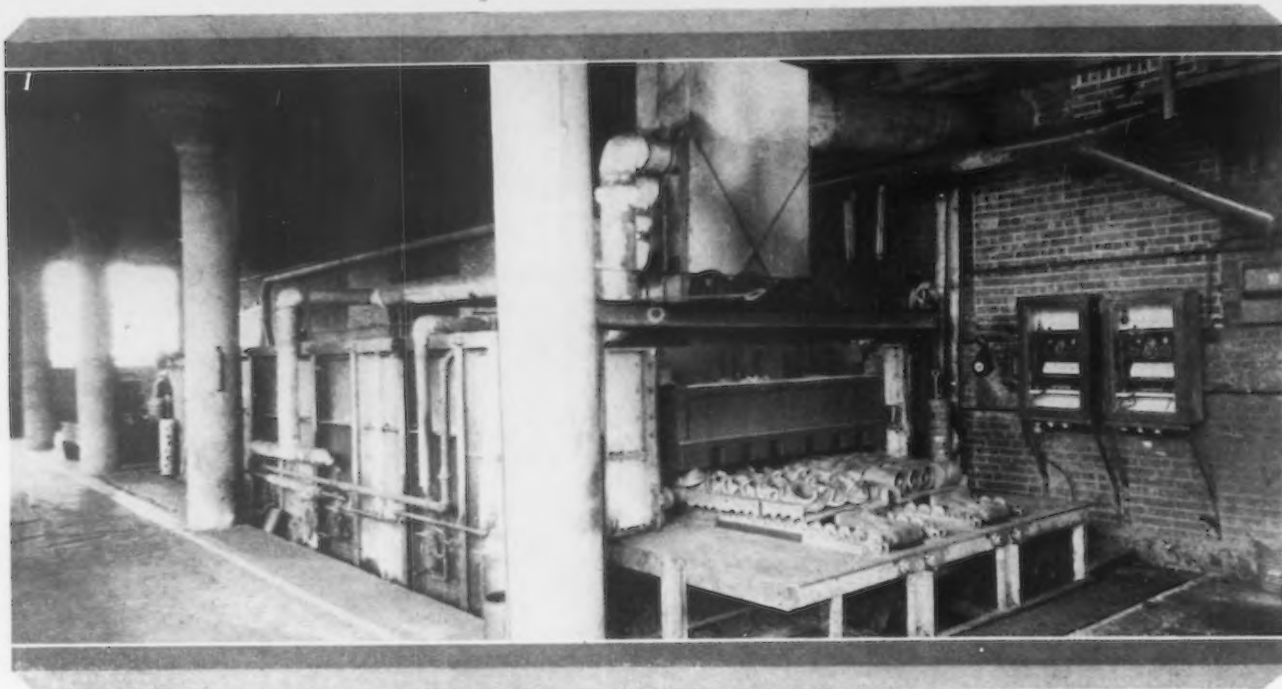
Regular cast iron and alloy cast iron, annealed 1000 deg. Fahr. Etched 1% nitric acid, 100 dia.



annealed at 1600 deg. Fahr. Etched with acid, 100 dia.

TABLE I—RESULTS OF ANNEALING REGULAR AND ALLOY CAST IRON

	Regular Iron, Per Cent	Alloy Iron, Per Cent
Chemical analysis:		
Silicon	2.07	2.11
Sulphur	0.087	0.078
Phosphorus	0.16	0.17
Manganese	0.72	0.68
Total carbon	3.38	3.34
Chromium .....	...	0.25
Nickel .....	...	0.62
Transverse test, 1.20-in. arbitration test bar:		
Breaking load, lb.	2,480	2,730
Deflection, in.	0.29	0.28
Tensile test:		
Ultimate strength, lb. per sq. in.	35,320	38,580
Brinell hardness	217	228



perature used for such heat treatment is between 900 and 1100 deg. Fahr.

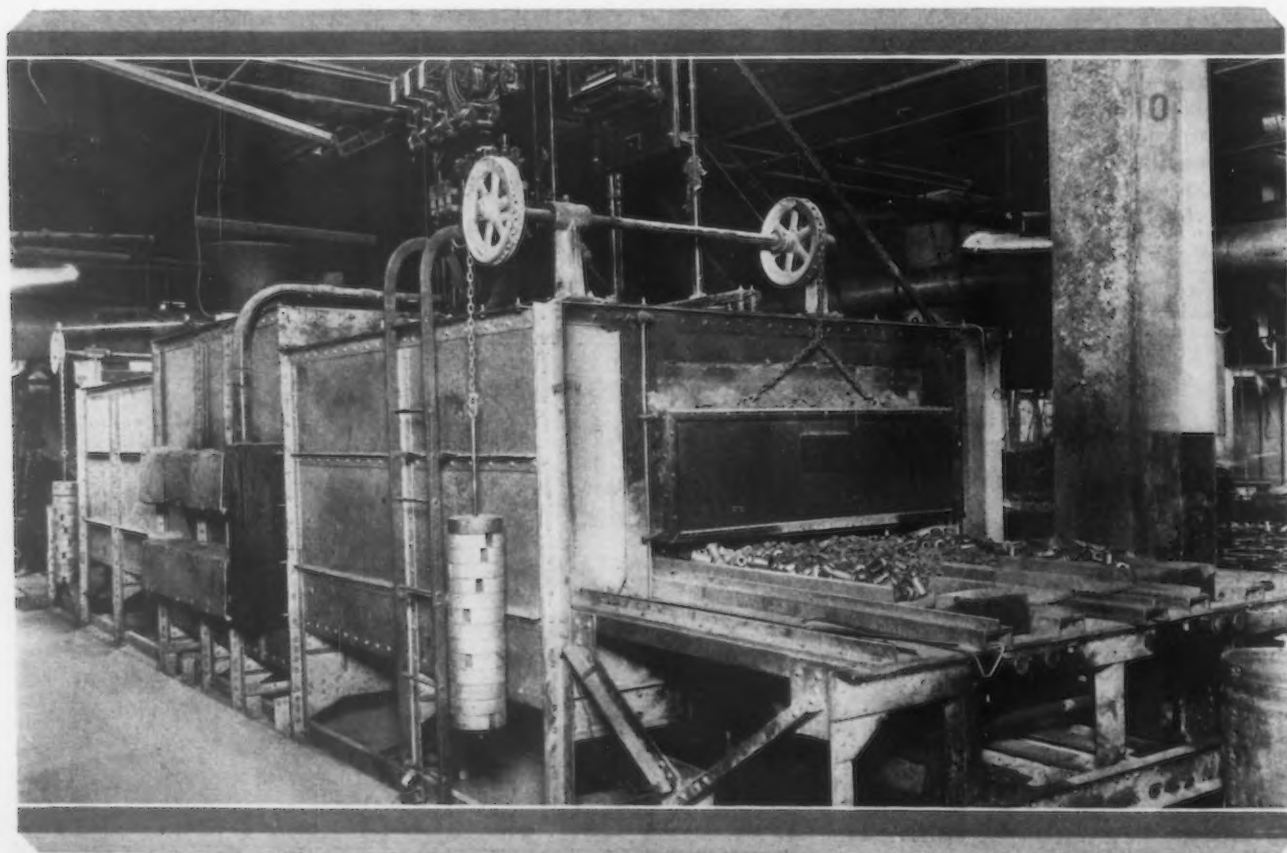
Heating cast iron in the range between 900 and 1100 deg. Fahr. will eliminate internal stresses without causing any structural changes in the metal. Above a temperature of 1150 deg. Fahr., there is a reduction in the combined carbon and a loss in hardness and strength. At the same time, there is an

increase in the machinability of the casting.

The field of heat treatment for cast iron which is growing rapidly at the present time is that of annealing to increase machinability. Particularly in the automotive industry, where machining speed is of great importance, there has been a rapid spread of this type of heat treatment.

Frequently, some strength can be sacrificed
(Continued on Page 756)

***OIL-FIRED** thoroughfare type of annealing furnace for gray iron in a tractor plant. Electric counter-flow annealing furnace (upper) for gray iron at an automobile plant*





Heat Treatment Continues to Advance

By HERBERT M. BOYLSTON

*Professor of Metallurgy, Case School of Applied Science,
Cleveland*

USE of alloy steels, both the old and the newer types, has increased steadily and rapidly in the last 25 years. In 1910 we had the simple alloy steels, like nickel steel (3.50 per cent nickel) and Hadfield's manganese (about 12 per cent manganese and 1.25 per cent carbon), vanadium steel, a little chrome steel (containing about 1 per cent chromium and 1 per cent carbon) and one complex steel (high-speed steel). There was also some silicon steel for transformer sheets (containing 3 to 4 per cent of silicon.)

Then came the chrome-nickel, chrome-vanadium, silico-manganese, and more recently the molybdenum, nickel-molybdenum and stainless steels. Now we have a number of high chrome-low-carbon, high chrome-high-nickel, and the still more recent chrome-aluminum steel known as nitralloy. Pearlitic manganese steels (1 to 2 per cent manganese) are also being made in considerable quantity, and structural silicon steel (about 2 per cent silicon) is used to some extent.

When it is remembered that without exception all these alloy steels are used in the heat-treated condition, it may be realized how important heat treatment

is and why it has created so much interest in the past 15 years. New steels are being developed every year, especially the austenitic variety, and all of them must have their heat treatment carefully worked out in order to give the designing engineer the greatest latitude in his choice of structural material for use in automobile, airplane and locomotive.

Carbon tool steels have always been heat treated after a fashion but new heat treatments and more careful control of heat treatment have been the order of the day in this field also.

Continuous Furnaces for Normalizing Sheets

During the past year much attention has been given to the normalizing of sheets for automobile body and other deep drawing requirements. This involved the design of continuous rolling mills and continuous normalizing furnaces which have created a revolution in the sheet steel business. Two of the most recent papers along this line are "Sheet Steel and Strip Steel for Automobile Bodies," by Joseph Winlock and George L. Kelley, *Transactions A.S.S.T.*, Vol. 18, Aug.,



WHEREAS 20 years ago there were but a few simple alloy steels, there are now many complicated ones, all of which must be heat treated.

New heat treatments for carbon steels have been developed with more careful control for the older methods.

The future will doubtless witness a greatly increased use of the research and precision instruments which have so far aided the heat treater so extensively.

1930, and "Recent Developments in Normalizing Sheet Steel," by Edward S. Lawrence, *Transactions A.S.S.T.*, Vol. 17, June, 1930.

"Nickel Alloy Steel Forgings," by Charles McKnight, *Transactions A.S.S.T.*, Vol. 18, Aug., 1930, page 129, describes briefly the manufacture, uses, analyses, heat treatment and properties of nickel alloy steel forgings larger than 4 in. in diameter or equivalent section.

"A Study of the Iron-Chromium-Carbon Constitutional Diagram," by V. N. Krivobok and M. A. Grossmann, *Transactions A.S.S.T.*, Vol. 18, July, 1930, carries up to a chromium content of 35 per cent and a carbon content of 0.60 per cent the work which had been previously carried out with alloys containing from zero to 18 per cent chromium and with lower carbon contents, and thus advances our knowledge of these new and increasingly important alloys. A. B. Kinzel and W. B. Miller, *Transactions A.S.S.T.*, Vol. 18, July, 1930, have given us some "Data on Manganese Structural Steels with Chromium Additions."

K. Heindlhofer and E. C. Bain, *Transactions A.S.S.T.*, Vol. 18, July, 1930, page 70, have published an important "Study of the Grain Structure of Martensite." This constituent, as nearly everyone knows, constitutes the structure of carbon or of alloy steels (except, of course, the austenitic variety) after quenching and before tempering, and its nature is exceedingly important in the study of the causes of the hardening of steel by quenching.

H. J. French has continued his study of the "Quenching of Steels," *Transactions A.S.S.T.*, Vol. 17, May, 1930, and June, 1930. This was published in response to requests for a coordinated summary of the several phases of this subject which the same author had published previously on several occasions and some new data are added also.

"The Economics of Heat Treating" is the title of a paper published by R. M. Keeney, *Transactions A.S.S.T.*, Vol. 17, May, 1930. The selection of the source of heat for industrial heat treatment is an economic problem, with the final choice dependent upon the economics of the situation, as shown by the over-all cost of the finished product with the different sources of heat. The type of heat-source chosen must result in the lowest over-all cost, or it will eventually be displaced by some more economical source. The rapid development of industrial electric heating emphasizes the fact that the source of heat for heat treating is not a problem of B.t.u. costs, but is an economic problem involving a study of over-all costs. Theodore F. Schilling discusses the "Practical and Theoretical Heat Balance for Rotary Forging Furnaces," *Transactions A.S.S.T.*, Vol. 18, Aug., 1930.

A Cross-Section of the Trend of Thought

This selection from the transactions of the American Society for Steel Treating offers a fair cross-section of the trend of thought which is going on in the minds of those vitally interested in the heat treatment of steel. Studies of the nitriding process are going on apace and always there is the effort to increase the efficiency and lower the cost of heat treatment operations, which involves among other things the improvement in design of furnaces, the improvement of in-

struments of control and the study of the metallographic theory back of all heat treatment.

Other important theoretical studies are two papers by Dr. Albert Sauveur, namely, "Austenite and Its Decomposition," *Transactions A.S.S.T.*, Feb., 1930, Vol. 17, and "Steel at Elevated Temperatures," *Transactions A.S.S.T.*, Vol. 17, March, 1930.

Another important contribution from this authority to the theory of heat treatment is "The Influence of Rate of Cooling on Dendritic Structure and Microstructure of Some Hypoeutectoid Steel," *Proceedings American Institute of Mining and Metallurgical Engineers*, February, 1930. This explains very clearly the conditions for the formation of the "Widmanstätten" structure in steel.

Extensive Research on Alloys of Iron

Within the year there has been established a committee and a program under the auspices of the research committee of the United Engineering Society (formerly Board of Engineering Foundation) for an extremely thorough examination of all existing data on alloy steels so that the information may be collected and digested for the benefit of the profession, so great has been the volume of investigational work in the last 20 years.

A glance at the subjects of some of the papers to be presented this month at the Chicago convention of the American Society for Steel Treating will also show the trend of present thought along the line of heat treatment and allied sciences.

More Refinement in Special Instruments

X-ray spectrometry and radiography have added much to our knowledge of the structure and the defects of metals in the past ten years but the use of the metallurgical microscope has also increased as steadily. The future will no doubt see a greatly increased use of these tools which have already helped the heat treater so much. There will be future refinements in the use of both as well as of pyrometers, dilatometers, magnetic testing instruments and many other valuable tools.

No single tool can tell the whole story any more than a mechanic can perform all his work with a monkey-wrench. He must also use his hammer, his screwdriver and occasionally a cold chisel. In the same way the heat treater and his scientific brother, the metallurgist, must use all the tools which are at their disposal and even develop some new ones in the continued search for better metals, better and cheaper heat treatments, new heat treatments and a better knowledge of the theoretical sciences, chemistry, physics, metallurgy and mathematics, on which scientific heat treatment is based.

Average farm wages at the peak in 1920 were 135 per cent above 1914. The depression of 1921 brought them down very sharply to 47 per cent above 1914. But, according to the National Industrial Conference Board, New York, in 1929 farm wages had increased to only 67 per cent over 1914 while the weekly earnings in manufacturing had risen 125 per cent above 1914. One compensation is the farmer's hired hand shares the family life and receives some compensation in this way.

Trends in Heat Treatment of Alloy Steel Castings

By A. W. LORENZ
Metallurgist, Bucyrus-Erie Co.,
Milwaukee

THE manufacture of alloy castings, and their associated heat-treatment, stands out as one of the most important developments in the steel founding industry. Several articles recently published in *THE IRON AGE* summarize the rapid increase in the production of alloy steel castings during the past few years, yet these statistics give no idea of the intangible effects which this development has had on the industry as a whole.

One of the immediate results has been a building up of technical personnel, and this in turn has made itself felt in all phases of foundry activity. The organization, or expansion, as the case may be, of a well-qualified metallurgical corps, has been a natural development wherever alloy steel castings are produced, and the technical facilities thus made available have been of the greatest value in the investigation of other problems pertaining to the industry.

Those foundries which pioneered in the manufacture of alloy castings have continued to broaden their activities through special research programs, and from this has come the development of many special-purpose steels, such as the high-temperature heat-resisting alloys and those

intended for various types of corrosion resistance.

Larger Use of Full Quenching Treatment

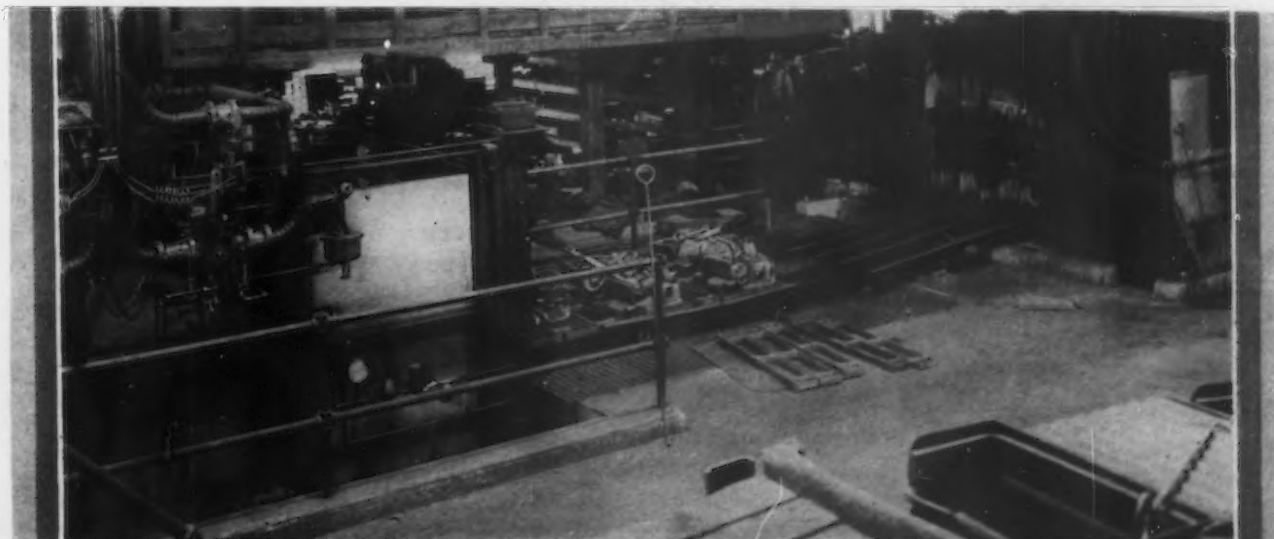
The particular development in heat treatment during the past year or two, so far as cast steels are concerned, lies in the rapid increase in the use of full-quenching treatments. Whereas the practice was, a few years ago, to furnish alloy castings only in the normalized condition, many foundries are today prepared to furnish almost anything in the line of heat-treated castings, and are intensively concentrating on the sale of fully quenched and tempered parts.

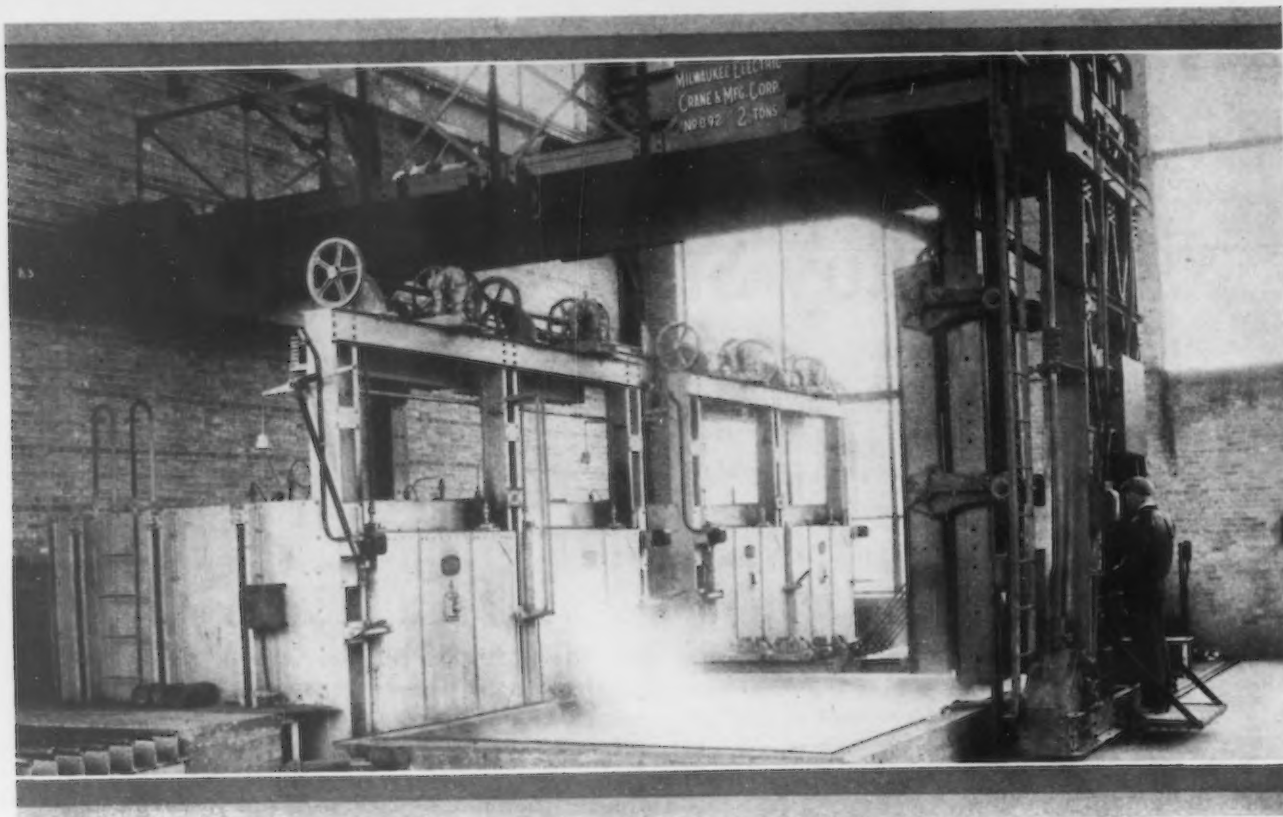
What is particularly to be noted is the type of equipment being introduced in the foundries to handle this class of work. Being to the steel founder a comparatively new venture, he is unhampered either by precedent or obsolete furnace units. These steel foundry installations, therefore, represent distinctly modern trends in the heat-treating art, and are models of efficiency for the work they are designed to handle.

Typical Modern Heat-Treating Equipment

A foundry in eastern Pennsylvania has recently installed a large oil-fired con-

***T**WO roller-hearth furnaces in straight line production with an intervening space for normalizing or quenching. Courtesy of the Geo. H. Smith Steel Casting Co., Milwaukee*





tinuous unit, automatically controlled, in which heating and cooling cycles may be carefully regulated to secure any structure within the castings that the purchaser may desire. The unit consists of two roller-hearth furnaces in straight-line production, with an intervening space adapted for normalizing or quenching treatments. Castings travel through on trays, passing at pre-determined speed through the first furnace, thence to the cooling gap, and finally into the second furnace for tempering.

A Wisconsin foundry has just completed the installation, in one of its subsidiaries, of a heat-treating plant specially designed for the treatment of small and medium-sized castings up to 3 ft. in diameter. The installation is unique in a number of respects. The furnaces, two in number, are of the circular pit type, protruding above the floor level about one foot. These furnaces are electrically heated, with full automatic control, further protected against over-heating in case of any break in the main control circuit, by a second auxiliary control. An interesting feature of this installation is the use of interchangeable furnace covers for different applications, so that the furnaces may be used for carburizing or nitriding, as well as for ordinary treatments.

For carburizing or nitriding, a cover is employed carrying a revolving fan actuated by a direct-connected motor above. The fan creates a circulation of the carburizing or nitriding gases throughout the charge. Pipe connections in the cover provide for admission of the gas as desired.

Carburizing is effected by means of Pyrofax gas, thus doing away with the labor, space, and dirt attendant upon packing in solid carburizers. This device also permits the use of a gaseous atmosphere in ordinary heat-treating processes, in order to reduce scaling and avoid surface decarbonization.

Between the above-described furnaces are located the oil and water tanks for quenching. The four units are directly in line, served by an overhead monorail.

Another installation described recently, and intended for castings up to several thousand pounds in weight, makes use of a special charging machine, which carries a set of prongs or forks by means of which an entire charge is lifted and deposited on grids within the furnace. For the handling of heavy castings, this arrangement is unusually fast.

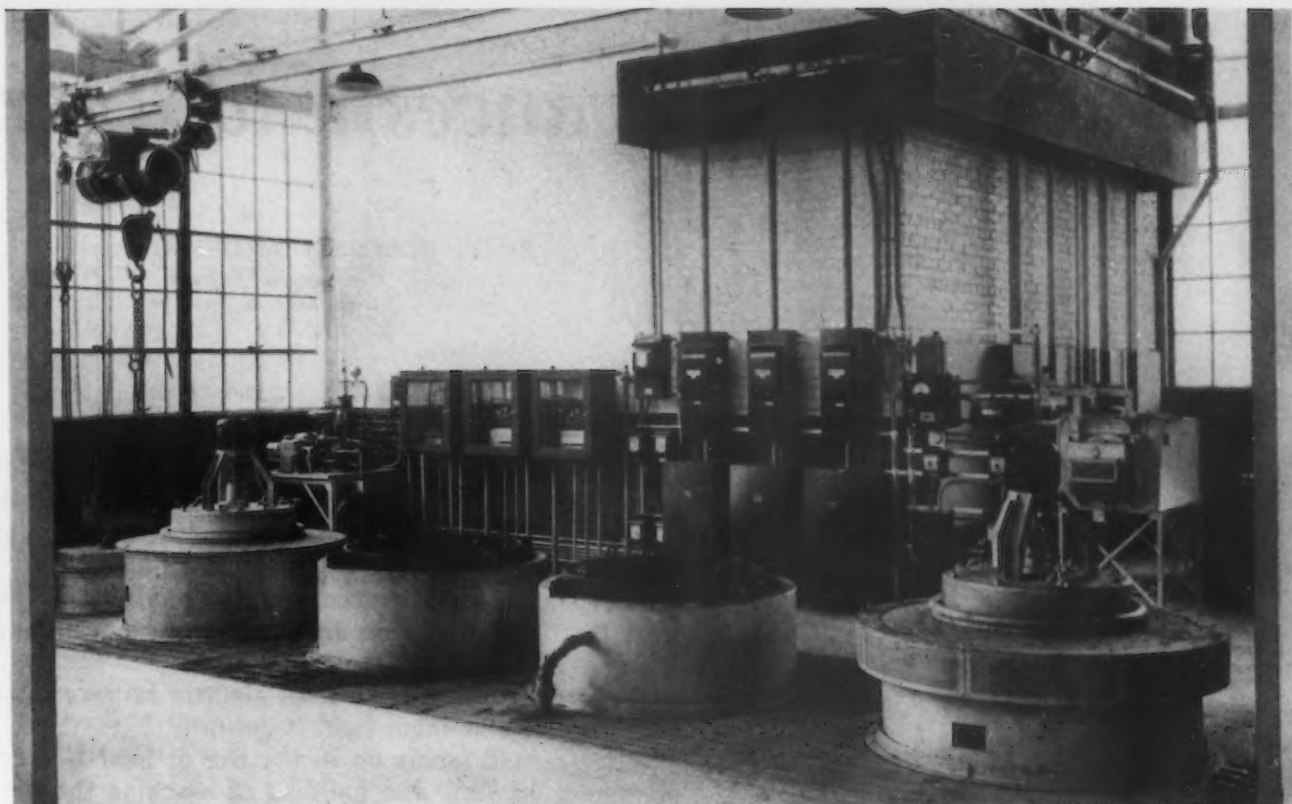
The handling of castings on the whole is a more difficult problem than the handling of forgings, due to their generally irregular shape,

MANUFACTURE of alloy steel castings and their heat treatment is one of the most important developments in the steel foundry industry.

¶ Rapid increase in the last year or two in the use of full quenching treatments stands out.

¶ Car-bottom annealing furnaces still remain the most preferred type for the average jobbing foundry.

¶ Three distinct classes of alloy steel castings have been developed—pearlitic manganese, nickel-chrome, and the air-hardening or Cr-Ni-Mo compositions.



greater variety, and larger average size. It is difficult to find a universal and economical means of handling the product of the average jobbing foundry in and out of an ordinary box type furnace. Continuous furnaces can be used to best advantage only where the production is large enough to permit segregating the castings according to size and type, so that proper cooling cycles can be maintained or adjusted. Rotating hearth furnaces have been applied in a few instances to the treatment of castings, but here again the difficulties attendant upon the charging of heavier pieces are practically as great as with a box-type furnace.

Car-Bottom Furnaces Preferred

For these reasons, the car-bottom furnace still remains the preferred type for the average jobbing foundry. The modern car-type furnaces for full quenching practice, however, are far superior to the old-fashioned car-bottom foundry annealers. They are well insulated to conserve heat; they are automatically controlled for temperature, and they are smaller and narrower as a rule, for more uniform heat distribution.

A foundry located in central Ohio has in operation a modern gas-fired installation of this type. It consists of two car-type furnaces with an adjacent quenching tank. These furnaces are held under accurate control by means of automatic equipment.

A SPECIAL charging machine (opposite page) carries a set of prongs or forks by means of which an entire charge is lifted and deposited on grids within the furnace. Courtesy of the Bucyrus-Erie Co., Milwaukee

Two circular pit-type electric furnaces with interchangeable covers. Two oil and water tanks for quenching are located between the furnaces, all served with an overhead monorail. Courtesy of the Trackson division of the Geo. H. Smith Steel Casting Co., Milwaukee

The cars are operated by motor driven rack and pinion drive, with push-button control. Castings are handled on trays, which are conveyed to the quenching tank by means of an overhead crane.

These illustrations are selected from among many to indicate the various types of equipment which are being employed

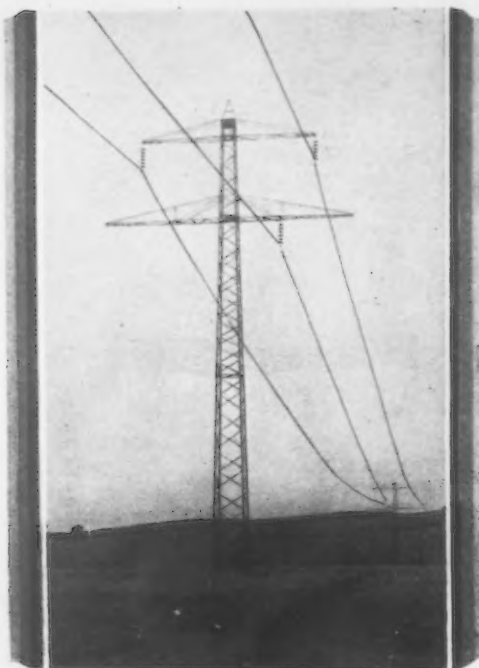
successfully in the heat treatment of intricate and oftentimes bulky castings.

Alloy Castings of Many Compositions

The present status of cast engineering steels is unsettled, and it is almost impossible to enumerate the many different analyses now being produced. Undoubtedly, two or three types should be sufficient for all general requirements, but it will be some time before the industry is in a position to arrive at standardization. This condition is brought about by the large amount of development work now going on, especially in the use of manganese in conjunction with other alloys.

In the field of low-priced steels, pearlitic manganese steel of approximately 1.25-1.75 per cent manganese is pre-eminently the most popular. While not quite as strong as some of the more expensive alloy steels, it offers maximum return with respect to cost. It is never recommended to be used in the annealed condition, and, in the writer's opinion, is not nearly as reliable in the normalized condition as some of

(Continued on Page 755)



High-tension cable lines. Wires are made of the aluminum alloy "Aldrey" (Vereinigte Aluminium-Werke, A. G.)

Advances and Trends in

By DR. ROBERT J. ANDERSON
Consulting Metallurgical Engineer,
Cleveland



BECAUSE the metallography of aluminum had not been currently developed with that of steel, millions of dollars' worth in sales were lost by the aluminum industry between 1910 and 1920.

Much more care is necessary in carrying out the heat treatment of aluminum alloys than is ordinarily required in dealing with steel.

The trend toward the use of electric furnaces and ovens in the aluminum field is definite.

A large field looms up in the use of heat-treated aluminum alloys in the building of machine tools in both the moving and dead-weight components.



PRIOR to the introduction of heat-treatment processes and the development of alloys especially susceptible to improvement by heat treatment, the engineering utilization of cast and wrought aluminum alloy products was very considerably restricted because of their relatively poor mechanical properties. As is well known, considerable time elapsed between the discovery by Wilm in 1903 that aluminum alloys could be heat treated and the commercial use of heat-treated manufactures in quantity. Lack of a working metallography was the primary deterrent to the commercialization of Wilm's discovery, and it was not until 1919 that an acceptable scientific explanation of the hardening-on-aging phenomena had been made.

Millions of dollars' worth in sales were lost by the aluminum industry between 1910 and 1920 primarily because the metallography of aluminum had not been currently developed to a science ranking with that of steel. Happily, this situation has been corrected in the past ten years, and research activity is nowhere now more pronounced than in the field of aluminum physical metallurgy. The commercial value of systematic research has been very strikingly demonstrated in the heat treatment of the light aluminum alloys.

It is significant to the future business welfare of many diverse branches of the metal industry that the heat treatment of aluminum alloys is here to stay. This development has resulted in radical departures in casting and fabricating methods, has opened up new markets for aluminum, and finally has been the direct cause for the increasing severity of competition

among structural materials. Heat-treated aluminum alloys are displacing old and previously well established materials in many engineering applications. It is no exaggeration to say that the development of heat-treatment processes (and of alloys especially suitable for heat treatment) has constituted one of the most important innovations in the history of aluminum metallurgy.

Alloys for Heat Treatment Are Numerous

Aluminum alloys suitable for the production of heat-treated parts, either cast or wrought, are very numerous, but the bulk of present commercial requirements can readily be met with a relatively few compositions. Some compositions are especially suitable for making wrought products, others are used primarily for castings, while a few may be employed satisfactorily for either. In most alloys used commercially, the heat-treating effects are due to either CuAl₂ or Mg₂Si, or both. With some few alloys, used particularly in Continental Europe, the hardening agent is Li₂Si or MgZn₂.

Special compositions have been developed for particular purposes, e.g., forging alloys, cable alloys, piston alloys, and compositions to be used in severe forming operations. Casting alloys usually contain from 5 to 12 per cent of added metals, and most alloys for the production of wrought manufactures contain about 4 to 6 per cent alloying elements. Cable alloys and some special forming alloys contain only 1 to 2 per cent of alloying constituents.

Information regarding the chemical compositions and mechanical properties of the heat-treatable alumi-

ls in Heat Treating Aluminum Alloys

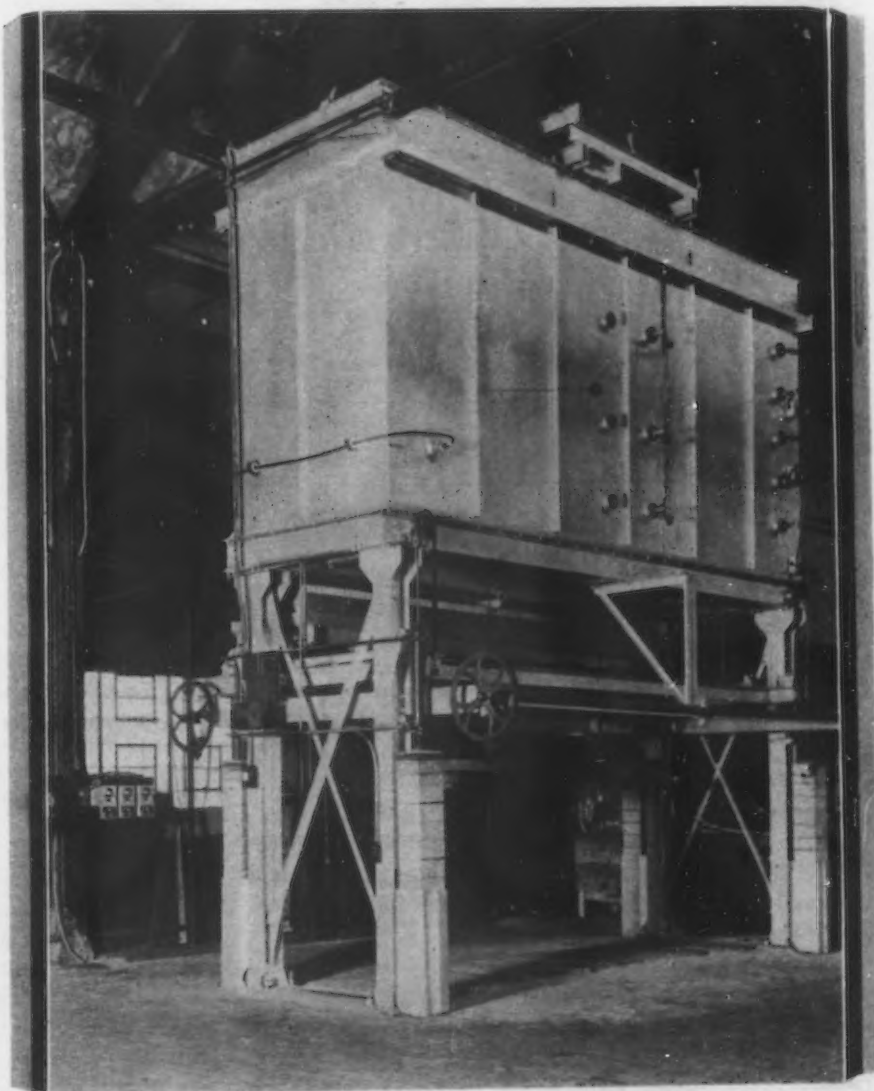
num alloys is readily available in many published papers. Here, it is of interest to touch on a few late developments. Alloys of the aluminum-magnesium silicide type have been developed especially for high-tension electric cables. These are given a special heat treatment to increase the strength and conductivity. The alloy called "Aldrey," used extensively for power transmission in Europe, contains about 0.4 per cent magnesium, 0.6 per cent silicon, and remainder aluminum (with impurities low). One illustration shows a supporting mast and wires in Aldrey of the Württembergischen Landes-Elektrizitäts, A. G., of Stuttgart, Germany. In order to get around existing patent claims, many new alloys have been introduced recently, and many new patents are being procured. It is of interest to point out that various high-melting point metals are being utilized in the development of new alloys, among which chromium, titanium, and molybdenum may be mentioned.

Heat-Treating Equipment Situation Changing

The situation with regard to equipment for heat treating aluminum-alloy products has been undergoing some changes. It is now generally recognized that accuracy of temperature control and uniformity of heat distribution are requisite and essential in a furnace to be used for either soaking prior to the quench or for aging. The heat treatment of aluminum alloys must be carried out with much more care than is ordinarily required in dealing with steel. Safe temperature ranges are limited, and the work is likely to distort or crack if not properly handled. There are many advantages in the use of electrically-heated equipment, and in the great majority of cases these advantages are sufficiently attractive to outweigh the higher initial and operating costs as compared with fuel-fired furnaces. There is a definite trend toward the use of electric furnaces and ovens.

Another illustration shows a view of a new type of electric-resistance furnace designed by the Gas Equipment Engineering Corporation, Philadelphia, especially for heating duralumin-type sheets prior to the quench. This furnace as designed, or with certain modifications, is also well adapted for the heat treatment of castings and special shapes. An important feature of the furnace is the position of the quenching tank with relation to the heating chamber. The latter is directly above the tank, and work may be transferred rapidly from the furnace to the quenching bath without appreciable loss of heat in the operation.

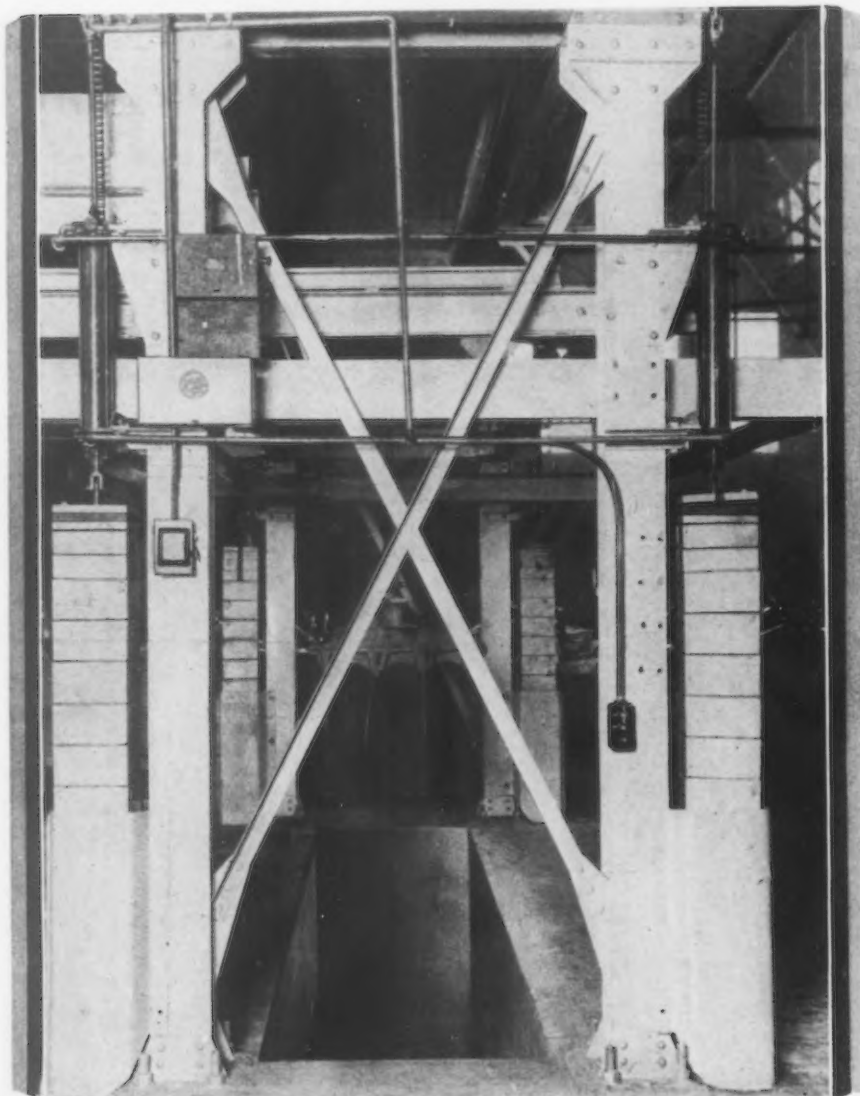
This is an important consideration in the selection



Electric resistance furnace was designed especially for heating duralumin-type sheets prior to the quench. At the left may be seen the temperature controllers and recording apparatus

of equipment for heat treating aluminum alloy manufactures. Another view shows the quenching tank and the supporting columns of the furnace. The furnace is closed by a bottom door which may be rolled back and forth. In the electrical hook-up, the furnace is divided into three zones, each one automatically controlled. The control equipment is shown in another picture. Circulation of the furnace at-

the production of aluminum-alloy manufactures of so much higher mechanical properties that these materials are now being used for a wide variety of engineering purposes where it was formerly impractical to consider aluminum alloys at all. Such manufactures have now been on the market long enough and in service under such a variety of conditions as to demonstrate thoroughly their worth.



Quenching tank for the heat treatment of the sheets is immediately underneath the furnaces, the supporting columns of which are shown

In a general way, heat-treated aluminum alloys have found the most usefulness and greatest variety of applications in all fields of modern transport—land, water, and air. A further increase in the use of heat-treated aluminum alloy parts is seen in the modern tendency to save weight and increase speed in all kinds of transportation.

The general field of application for heat-treated alloys, both cast and wrought, is for stressed parts (and generally in place of heavier alloys), the only limitations being the possible mechanical properties and the cost. One of the most striking developments is the production of large I-beams and other shapes, hitherto available only in steel. Such shapes are to find application in the construction of passenger cars for steam roads and street railroads. Despite the considerably higher cost, it is possible that such shapes may also have application in the construction of towers on top floors of modern skyscrapers in place of steel. There is an especially good future for the use of heat-treated alloys, both cast and wrought, in the construction of steam and electric-railroad cars. Heat-treated alloys constitute one of the main construction materials for aircraft, and a definite trend is seen in their more extensive utilization in high-

speed and heavy-duty trucks and buses, particularly in body building.

mosphere is provided by fans mounted in the roof. Side-charging electric furnaces have been used recently for heat treating tubing. Automatic control is found necessary in both electric and fuel-fired furnaces for the best results.

Uses of Heat-Treated Products

There have been many interesting developments of recent years which have made possible the use of heat-treated aluminum alloys in place of malleable iron and steel castings, brass and bronze castings, copper, brass, and steel sheet, steel tubes and sections, and steel forgings. Heat treatment has made possible

speed and heavy-duty trucks and buses, particularly in body building.

There is a large field for the utilization of heat-treated aluminum alloys in the building of machine tools and machinery generally, both in the case of moving parts and of dead-weight components. Large increases in the use of the alloys cannot come in new fields unless the price is reduced. At current prices, the alloys can supplant less expensive materials only by superior performance. The limit has evidently not been reached in the strength-weight ratio of the heat-treated alloys, and recent developments indicate that alloys superior to those now used will be produced.



National Metal Congress Assembles in Chicago This Month

AT the National Metal Congress to be held in Chicago, Sept. 22 to 29, the National Metal Exposition will for the first time be housed in a hotel. Something like 80,000 sq. ft. of space in various parts of the Hotel Stevens has been allotted to the booths. These will accommodate over 200 exhibitors, the space allowed to each one being somewhat less than at former large expositions. The main exhibiting room will be the grand ballroom of the hotel.

An extensive array of papers is offered by the various technical societies participating in the Congress: American Society for Steel Treating, American Welding Society, machine shop practice divi-

sion and the iron and steel division of the American Society of Mechanical Engineers, the institute of metals division of the American Institute of Mining and Metallurgical Engineers. About 60 papers are scheduled for the various simultaneous technical sessions. The programs are included in the following pages.

It has been possible to obtain photographs of chairmen of most of the chapters of the American Society for Steel Treating and these are reproduced on the following pages.

Accounts of the leading features of National Metal Week will be published in *THE IRON AGE* of Oct. 2 and succeeding issues.

What the Exhibitors Will Display

A

Air Reduction Sales Co., New York. Booth 95.

Ajax Electrothermic Corporation, Trenton, N. J. Booth 5-D.

A 1000-lb. Ajax-Northrup coreless high frequency induction furnace, and photographs showing installations of such furnaces and the equipment necessary for operating them. In attendance: G. H. Clamer, president; E. F. Northrup, vice-president and technical adviser; Dudley Willcox, treasurer and assistant general manager; R. N. Blakeslee, secretary and sales manager; A. D. Meyer, sales metallurgist; G. F. Applegate, shop foreman.

Allegheny Steel Co., Brackenridge, Pa. Booth 9-D.

Allegheny metal, Ascoloy No. 33, Ascoloy No. 44, Ascoloy No. 55, in various stages of manufacture and processing as produced by many nationally known manufacturers. In attendance: O. M. Otte, L. W. Hostettler, C. W. Green, Russel Allen, P. B. Van Horne.

Edgar Allen Steel Co., Inc., New York. Booth 5-B.

Imperial "Major" high-speed steel; Imperial "extra special" high-speed steel; Imperial "special" high-speed steel; turning and finishing steels; Minerva air hardening steel; self hardening steel; special chisel steel; Red Label steel; tack knife steel; die casting steel; solid Double Six production steel; hollow Double Six production steel; class "P" tool steel; class "E" tool steel; Stag tool steel; Talon tool steel. In attendance: Henry Sears Hoyt, president; V. A. Greene, vice-president and general manager; E. R. Carnell, director; H. R. Adams, manager Chicago branch; R. M. Brushingham, Detroit district manager.

Allied Oil Co., Cleveland. Booth 10-F.

A working display of Shell pickling acid and straight commercial sulphuric acid; also a display of samples of several S.A.E. grades of steel and other materials; these will contrast the results of pickling with commercial sulphuric acid with the noncorrosive, nonpitting effect of Shell pickling acid. In attendance: W. B. Stevenson, sales engineer, by-

product division; E. G. Richardson and J. L. Manneville, assistant sales managers, by-product division; C. C. Crane, chief chemist for the Keystone Steel & Wire Co.; D. P. Summers, vice-president and general superintendent, Keystone Steel & Wire Co.; E. P. Kastien.

Aluminum Co. of America, Pittsburgh. Booth 5-L.

Aluminum in all commercial forms.

American Brass Co., Waterbury. Booth 92.

Anaconda nonferrous welding rods. Featuring Tobin Bronze and Everdur Welding Rods. Samples of cast iron pieces welded with Tobin Bronze. Display of Everdur Metal—a copper-rich alloy, containing manganese and silicon, with the strength of mild steel. The proper methods used in welding with Tobin Bronze filler rods and the oxyacetylene process will be demonstrated. In attendance: W. H. Dowd, exhibit manager; A. M. Dinkler, assistant manager, Ansonia branch; W. C. Swift, service engineer; A. L. O'Brien, service engineer; C. D. Pillsbury, agent; I. C. Ralph, service engineer; J. P. Hocking, F. W. Hackett, F. E. Hill, H. G. Wallis.

American Car & Foundry Co., New York. Booth 51.

A. C. F. Berwick, electric rivet heater; A. C. F. Berwick, electric forging heater, for heating stock for forging and upsetting. In attendance: F. C. Cheston, A. G. Wood, Harold Cheston.

American Cyanamid Co., New York. Booth 19-B.

Samples and literature. In attendance: G. N. Omohundro, industrial chemicals division; H. H. Suddard, Chicago representative; G. B. Horsfull, Detroit representative; H. M. Sunderland, Cleveland representative; George D. Johnson, metallurgist; P. E. Holder, field metallurgist; E. L. Knapp, field metallurgist.

American Forge Co., Chicago. Booth 7-F.

Sample upset forgings. In attendance: W. E. Crocombe, president; F. Gauch, vice-president; F. L. Moore, production manager; A. Nettenstrom, assistant plant superintendent.



H. S. RAWDON
Bureau of Standards
Chairman, Washington-
Baltimore Chapter



JAMES H. SPADE
Ludlum Steel Co.
Chairman, Los Angeles
Chapter

ent; H. Mulford, sales manager; S. E. Burns, sales department; L. W. Eighmy, sales department.

American Gas Association, New York. Booths 50, 52 and 62.

American Gas Furnace Co., Elizabeth, N. J. Gas Section.

No. 166 reciprocating hearth continuous heating machine with No. 4-F mesh wire conveyor continuous quenching tank; large No. 121-A oven furnace with Nichrome hearth for general heat treating and carburizing; No. 2-B rotary retort carburizing machine having available heating space in the retort 14½ in. diameter by 48 in. long for carburizing either with gas or compound; No. 1 rotary retort melting machine; capacity, 200 pounds of brass; No. 116 insulated tool room oven furnace; No. 131 insulated tool room oven furnace; small equipment, including No. 3 regular melter which may be used for making coal ash tests; cylindrical furnace with dilatometer, cyanide furnace, tool room forge, muffle furnace, also bench appliances such as soldering iron heaters, soft metal furnace, blowpipes and burners; heating machines and furnaces will all be equipped with the American Gas Furnace Co. automatic temperature controllers and flow meters. In attendance: P. C. Osterman, vice-president; E. C. Cook, John Mehrman, Theodore Farwick, Sr., William J. Barescheer, Gustav Schwab, O. T. Muehlemyer, S. C. Dinsmore, W. H. Kelsey.

American Steel & Wire Co., Chicago. Booth 71.

Tested Premier welding wire and rods; cold-drawn and cold-rolled strip steel, for stamping and all manufacturing purposes; springs for the watch to the locomotive; manufacturing wires and rods in round, flat, square, oval, star and other odd shapes for various manufacturing purposes. In attendance: F. Connell, W. E. Mackley and G. S. Rose of New York; E. S. Humphrys, C. J. McGregor, H. B. Maguire, A. E. Ward, P. M. Jones, W. L. Blazier, R. C. Fisher, L. S. Young, W. H. Cordes, E. E. Louis, and R. Francisco of Chicago.

Anchor Drawn Steel Co., Latrobe, Pa. Booth 24-B.

Fractures, samples, shapes and sections of stainless irons and steels, nitriding steels, copper clad irons and steels, high speed, carbon and alloy tool steels. In attendance: R. C. McKenna, president; Floyd Rose, vice-president; L. D. Bowman, works manager; J. P. Gill, chief metallurgist.

Armstrong-Blum Mfg. Co., Chicago. Booth 29.

Demonstration of metal-sawing equipment. New model full ball-bearing, high-speed Marvel hack saw No. 6 and No. 6A shown for first time on full automatic production cutting-off work; also showing No. 8 Marvel metal band saw in universal application to a wide variety of sawing work in bars, structural shapes, pipe, etc.; also showing breakdown test on Marvel high-speed-edge power hack saw blades. In attendance: Harry J. Blum, secretary; Stanley A. Woleben, assistant secretary; Gustav M. Hess, salesman.

Armstrong Brothers Tool Co., Chicago. Booth 27.

Lathe, planer and shaper tools; lathe dogs; "C" clamps; ratchet drills; drop forged wrenches; pipe tools. In attendance: Horace Armstrong, W. T. Armstrong, George Nufer.

Armstrong Cork & Insulation Co., Lancaster, Pa. Booth 6-L. Armstrong's insulating brick; Nonpareil insulating brick; Armstrong's cork covering; Armstrong's corkboard roof insulation; Armstrong's high-pressure covering. In attendance: Paul Talchinger, manager, Chicago office; S. M. Jenkins, special sales representative; L. W. Bertelsen, Pittsburgh.

Associated Alloy Steel Co., Cleveland. Booth 3-D.

Nirosta KA2 and Nitralloy. In attendance: D. B. Carson, vice-president, in charge of sales; H. A. DeFries, chief metallurgical engineer; C. B. Boyne, assistant sales manager; K. G. Reynolds, architectural representative; W. L. Wiewel, sales manager, tube division; P. E. Floyd, district sales manager Chicago; W. Kinsey, district sales manager Cincinnati; A. N. Vogt, district sales manager Cleveland; J. E. Polhemus, district sales manager Detroit; R. P. McCarty, district sales manager New Haven, Conn.; P. L. Coddington, district sales manager New York; G. F. Willson, district sales manager Philadelphia; W. L. Weaver, district sales manager Albany, N. Y.

Automatic Temperature Control Co., Inc., Philadelphia. Booth 27-D.

Valves disassembled for inspection, including "V" port proportional opening types; motor operated controllers; Motomercos relays to operate three-position valve controllers from a two-contact instrument; time cycle contactors for automatic greasing, load advancing in continuous furnaces, etc.; motor operated interrupters; electric heat controller; contact instruments of various makes will be shown operating with control equipment.

B

Babcock & Wilcox Co. and Babcock & Wilcox Tube Co., New York. Booth 32-B.

Welded pressure vessels, specimens of welds in carbon steel and stainless alloy steels made by the Babcock & Wilcox Co.; chromium nickel alloy steel process equipment showing typical welded construction; heat exchangers of rustless steel; castings made in chromium alloy steels; oil still headers cast in chromium nickel alloy steel; cast alloys for high temperature service; rustless steel tubing. In attendance: W. W. Eaton, J. Brett, A. G. Reilly, A. R. McAllister, J. C. Hodge, S. J. Crooker, W. E. Sparrow, Jr., R. L. Ripley, H. D. Newell, N. Hamilton, Magnus Christensen, W. M. Glen.

Bastian-Blessing Co., Chicago. Booth 96.

Rego welding and cutting torches, regulators and other equipment; the Red Star Precision duplex regulators, the Rego Economizer and Rego S. M. torch in an operating job of silver soldering brass and copper parts; the Rego airplane welding torch, the Rego-Thomas pipe welding torch and the Rego cutting torch. In attendance: E. L. Mills, sales manager; L. C. Roney, E. N. Stevens, H. A. Goodwin, J. T. Kinney, G. W. Irwin, T. H. Kennedy, C. H. Sandberg, F. C. Lane, M. J. LaDue, T. Norden and E. M. Evleth.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth 34-B.

Microscopes, specially designed for use in the steel treating industry, photomicrographic apparatus, colorimeters, tool makers' microscopes, metallographic equipment, magnifiers, reading glasses and numerous other optical instruments of interest to steel treaters. In attendance: I. L. Nixon, H. L. Shippy, W. Patterson, M. Stevens.

Bell & Gossett Co., Chicago. Booth 46-B.

Steel treating materials, including Bohnite carburizing compound; barium carburizing compound; Caselte cyanide mixture; Bathite, a heating medium containing no cyanide; Drawite drawing salts; Non-Case selective case hardener; cyanides, pure and mixtures; furnace cements, dry and plastic; also exhibiting steel treating equipment including scleroscope and Brinell hardness testers; pressed steel pots; sheet alloy containers; cast alloy containers; electric, gas and oil furnaces; B-G quenching oil coolers; quenching tanks; liquidometers; water heaters; B-G quenching oils. In attendance: W. C. Bell, E. J. Gossett, J. S. Ayling, W. Ellis, W. P. Gossett, C. C. Becker.

Bethlehem Steel Co., Bethlehem, Pa. Booth 30-B.

Structural steel exhibit to consist of framework of structural steel and display boards showing typical sections; alloy steel exhibit showing samples of Mayari steel, Supertemp steel, Resilia spring steel and other alloy steels; an exhibit of corrosion resisting or non-rusting steels, including Bethalon, the free-machining, non-rusting steel; an exhibit of tool steels featuring Comokut and Bethlehem special high-speed tool steel. In attendance: G. F. Hocker, manager of sales, forgings and castings; R. S. Tucker, manager of sales, alloy steels; D. C. Roscoe, manager of sales,

tool steels; T. J. Fitzgibbons, sales agent, drop forgings; F. H. Baldwin, sales department; J. E. McKinney, metallurgical engineer; W. R. Shimer, metallurgical engineer; T. G. Foulkes, research metallurgist; J. P. Witteman, metallurgist; A. P. Spooner, engineer of tests; J. H. Stoll, assistant engineer of tests; H. R. Weeman; H. W. Hibshman; W. E. Titus; H. E. Graffin; G. Cushman; J. W. Codding; F. E. Fisher; R. MacDonald; J. F. Gaffney.

Botfield Refractories Co., Philadelphia. Booth 45.

Refractories, cements and mixtures. In attendance: Axel H. Engstrom, sales manager; W. B. Smith, Midwestern field representative.

Bristol Company, Waterbury, Conn. Booth 27-B.

Automatic control equipment, comprising pyrometers and thermometers, recording and controlling complete equipment for heat treating furnaces, oil baths, enameling ovens, core ovens and so forth, including all types of electric and air operated controllers. Also Bristol set screws and cap screws, specially heat treated. In attendance: H. L. Griggs, general sales manager; L. G. Bean, Chicago district manager; H. W. Moss, Detroit district manager; J. L. Williams, Boston district manager; R. M. Walker, Pittsburgh district manager; G. H. Gaites, Philadelphia district manager; C. W. Williamson, New York; W. F. Emery, sales engineer, Detroit; C. Worth, sales engineer, Chicago; H. Will, sales engineer, Chicago; A. O. Garver, sales engineer, Indianapolis.

Brown Instrument Co., Philadelphia. Booth 21-B.

A full line of instruments for measuring and controlling furnace temperatures and other operating factors in metal working; a central feature is a display of Brown automatic control pyrometer equipment; also a Brown model 801 Indicator and the Brown trend-analyzing recorder; other features include recording thermometers; Brown electric flow meters; tachometers; CO₂ meters. In attendance: George W. Keller, vice-president and general manager; C. L. Saunders, district manager; J. C. Vaaler, W. L. Gustafson, M. F. Jacobs, N. I. Cockley, I. K. Farley.

C

Calorizing Co., Wilkesburg, Pa. Booth 12-Ba.

Andrew C. Campbell, Inc., Waterbury, Conn. Booth 25.

A Campbell nibbling machine; two display boards, one showing parts or articles that were "nibbled" on the Campbell nibbling machine and the other showing photographs of the several models in which the machine is made. In attendance: H. R. Powell.

Carboloy Co., Inc., Detroit. Booth 10.

A turret lathe tooling up with Carboloy tools to simulate conditions surrounding ordinary production job; display boards showing typical tools and specimens of materials machined with Carboloy tools, wire drawing dies, with specimens of materials drawn. In attendance: W. W. Fullagar, Chicago district manager; P. O. Deeds; N. N. Shepherd; G. M. Moote; E. V. Johnson; F. R. Johnson; P. J. Connor; W. S. Baker; E. C. Howell, advertising manager; V. L. Allen, assistant advertising manager.

Carborundum Co., Niagara Falls. Booth 53.

Carborundum and Aloxite brand grinding wheels for all grinding purposes, Aloxite brand Redmanol superspeed snagging wheels, Carborundum brand green grit wheels for grinding tungsten carbide, Carborundum and Aloxite brand polishing grains, Aloxite brand cloth. In attendance: S. F. Courter, general sales manager; B. N. Work, sales engineer; F. E. Gridley, district sales manager, Chicago; R. C. Bradbury, Chicago; Robt. Rannie, Chicago; C. E. Hawke, sales manager, refractory division, Perth Amboy; R. A. Beverly, Chicago; S. A. Fenno, Cleveland.

Carborundum Co., Perth Amboy, N. J. Booth 53.

A completely assembled section of the Carborundum Co. recuperator, showing the construction details of the recuperator and the operation of the unit; in addition, mounted samples of refractory brick, tile and special shapes, including hearths and muffles for heat treating furnaces and samples of different types of high temperature cements, manufactured by the refractory division of the Carborundum Co. In attendance: R. A. Beverly, S. A. Fenno, district sales managers; J. A. King, R. S. Baker, R. J. Penny, W. C. Thiess, sales engineers.

Carpenter Steel Co., Reading, Pa. Booth 6-B.

Carpenter rustless steels and articles made of these materials; the different steps in "Disk" tool steel inspection (disk inspection by the hot acid etch method) illustrated. In attendance: F. A. Bigelow, president; J. H. Parker, vice-president; R. V. Mann, assistant to president; F. R. Palmer,



J. S. AYLING
Case Hardening Service
Co.
Chairman, Cleveland
Chapter



D. M. FRASER
Peerless Engineering Co.
Chairman, Ontario
Chapter

assistant to president; B. H. DeLong, metallurgist; G. V. Luerssen; P. B. Greenawald; O. V. Greene, metallurgical department; G. H. Edmonds; W. M. Loos, sales department; R. L. Williams, Detroit district sales manager; H. J. Joyce, Indianapolis district sales manager; J. B. Guthrie, Chicago district sales manager; K. L. Crickman, St. Louis district sales manager; E. Von Hambach, L. E. Cooney, R. I. Beeson, C. W. Windfelder, E. E. Mueller, J. L. Hall and Leroy Owen, sales representatives.

Case Hardening Service Co., Cleveland. Booth 46-B.

Hardening room materials and equipment; Bohnite, carburizing compound; Caseite, cyanide hardening compound; Cyanide, all grades; Drawite, drawing salts, range 300 to 1200 deg. Fahr.; Bathite, hardening salts, range 1200 to 1700 deg. Fahr.; Cleancoat, lead pot covering; Non-Case, anti-carburizing paint; pressed steel pots; B and G oil coolers; Resistal sheet alloy pots and boxes. In attendance: W. C. Bell, president; E. J. Gossett, vice-president; J. S. Ayling, sales manager; C. P. Critzer, sales engineer.

Chicago Steel Foundry Co., Chicago. Booth 41.

Exhibiting: A number of castings in PyraSteel for heat resisting, and in EvanSteel for strength and abrasion resisting. In attendance: David Evans, president; B. G. Tarkington, engineer; C. McA. Evans, assistant to president; J. A. Marr, works manager; Joe Frank, assistant superintendent; G. MacMillan, metallurgist; A. I. Gilbert, purchasing agent.

Chicago Steel & Wire Co., Chicago. Booth 106.

Climax Molybdenum Co., New York. Booth 23-D.

Molybdenum in the various forms as used by the iron, steel, chemical and dye industries. In attendance: H. L. Brown, acting general manager; J. B. Thorpe, assistant to president; A. Kisson, vice-president, in charge of production; W. P. Woodside, district manager, Detroit; George O. Loeffler, district manager, Pittsburgh; E. R. Young, metallurgical engineer, Detroit; J. Kent Smith, consulting metallurgical engineer.

Colonial Steel Co., Pittsburgh. Booth 24-B.

Fractures and samples of high speed, carbon and alloy tool steels; fractures and samples of ply steels, including plow and jail steels; samples of mining drill steel; samples of copper clad steels; samples and fractures of stainless irons and steels; samples and fractures of Nitralloy nitriding steels. In attendance: R. C. McKenna, president; Floyd Rose, vice-president; Lawrence Wood, general sales manager; J. P. Gill, chief metallurgist; N. B. Hoffman, metallurgist; T. Howe Nimick, assistant sales manager; H. M. Bray, Detroit manager; I. N. King, Pittsburgh representative.

Columbia Tool Steel Co., Chicago Heights, Ill. Booth 23-B.

Clarite high-speed steel, Maxite super high-speed steel, Superdie high carbon, high chromium steel, Oldie non-shrinking steel, Buster Brand alloy steel; special quality, extra quality and standard quality carbon tool steel, in bar form; ingots, alloys and fractures; tools and articles made with Columbia tool steel. In attendance: A. T. Clarage, president; R. M. Sandberg, general manager; C. B. Shoen-



berger, general superintendent; W. J. Mathews, superintendent of melting department; A. J. Scheid, Jr., metallurgist; T. G. Dougall, Chicago district sales manager; A. J. Scheid, Milwaukee district sales manager; A. W. Mierow; C. F. Scheid; W. M. Hopkins; T. L. Haines; L. Elsmann; S. F. Evans.

Corhart Refractories Co., Inc., Louisville, Ky. Booth 6-F.
Refractory shapes on tables with simple demonstrations of the properties of the material, also service photographs. In attendance: Fred W. Schroeder, metallurgical engineer; H. W. Baque, sales engineer; Fred S. Thompson, sales manager.

Crucible Steel Co. of America, New York. Booth 28-B.
Noncorrosive material in various exhibits tending to show the forming, welding and finish of our corrosion resistant steels will be on display. In attendance: F. B. Hufnagel, president; Dr. J. A. Mathews, vice-president; A. T. Galbraith, vice-president; R. E. Christie, E. P. Gaffney, R. H. Heatley, J. W. Taylor, J. D. White, T. W. Pennington, J. S. Ewing, F. Baskerville, J. C. Woodward, P. E. Tobin, E. H. Walters, J. H. Jones, R. H. Fletcher, William Stevenson, C. A. Oehring, J. A. Bespole, A. C. Paulson, K. S. Daniels, A. J. Schatke, D. K. Miller, F. A. Coddington, J. F. Taylor, R. B. Hayward, F. W. Weber.

D

Dardelet Threadlock Corporation, New York. Booth 19-D.
Dardelet nuts, bolts and threaded parts; applications of the Dardelet principle; cutting tools for the manufacture of Dardelet thread. In attendance: Lucien C. Sprague, executive vice-president; Norman C. McLoud, executive representative; William L. McKay, sales promotion engineer; F. D. Moore, sales promotion engineer; Edward J. McManus, laboratory foreman.

Darwin & Milner, Inc., Cleveland. Booth 17-B.
Alloy tool steel products; display of dies and tools demonstrating quantity production, notably with the oil-hardening, non-deforming die steel Neor and air-hardened patented Cobaltrom steel; display of form tool castings made of patent Cobaltrom steel; and Darwin patent Cobaltrom steel safety razor blades. In attendance: Victor Tlach, president; John C. Koch, secretary; H. L. Harrison and Charles F. Lear, representatives.

Dearborn Chemical Co., Chicago. Booth 6-D.
No-ox-id, rust preventive; No-ox-id-ized wrappers; Dearborn mill coat; Lo-ac, a concentrated water soluble rust inhibitor; powdered and liquid cleaners. In attendance: E. M. Converse, Chicago; assisted by C. C. Rausch, Chicago; C. I. Loudonback, Detroit; J. A. Craenner, Pittsburgh.

Driver-Harris Co., Harrison, N. J. Booth 20-B.
Heat treating containers and furnace parts made of Nichrome, heat-resisting alloy; also carburizing boxes, both cast and sheet, and also boxes combining sheet and cast parts; die cast pyrometer protection tubes; lead, salt and cyanide pots; dipping baskets; trays, rollers, fixtures and



GEORGE A. UHLMAYER
People's Power Co.
Chairman, Tri-City
Chapter



D. L. COLWELL
Stewart Die Casting Co.
Chairman, Chicago
Chapter

other furnace parts; bolts and nuts; retorts, mufflers and small intricate castings. In attendance: F. L. Driver, Jr., president; F. V. Lindsey, vice-president and sales manager; J. M. Lohr, metallurgist; J. C. Bilek, Chicago sales manager; Mr. Thornquist; J. B. Shelby; G. M. Pinney; W. E. Blythe, Detroit sales manager; L. Prior, C. Pettit; Messrs. Hobbie and Eckley.

Duriron Co., Dayton, Ohio. Booth 43.
Duriron and Durimet acid-resisting pumps, exhaust fans, valves, tank rods, steam jets and Durimet welded pickling tank. In attendance: M. W. Smith, G. A. Baker, N. E. Philpot, E. R. Suter, R. C. Schenck.

E

Eclipse Fuel Engineering Co., Rockford, Ill. Booth, Gas Section.

Combustion equipment for large gas-fired furnaces, including an operating layout of centrifugal blowers, automatic air and gas proportional mixers, automatic temperature controllers and burners; also typical heat-treating furnaces and new developments in accessory equipment; various types of high and low pressure gas burners for large capacity uses; also automatic temperature control equipment and several proportional gas and air mixing systems and new immersion type heating equipment. In attendance: G. W. McKee, O. M. Olsen, K. A. Scharbau, D. A. Campbell, L. J. Strohmeier, E. A. Stoner, C. H. Martin, O. N. Sellers, C. J. Michelet, P. L. Raymond.

Elkon Division of P. R. Mallory Co., Inc., Indianapolis. Booth 98.
Specimens of typical Elkonite welding electrodes and dies for electric resistance welding together with many varied specimens of metal parts successfully welded with Elkonite; a motion picture in continual operation, showing a typical Elkonite die application; a complete line of Elkon electrical contacts; a high temperature electric furnace. In attendance: G. V. Rockey, general sales manager; E. W. Bremer, New York representative; E. C. Howell, advertising manager; E. O. Oberdick, sales manager, contact division; J. A. Welger, engineer.

Electric Furnace Co., Salem, Ohio. Booth 4-L.
Photographs of electric, oil and gas-fired furnace installations, including new chain belt conveyor, pit type, car type, recuperative, roller hearth and rotary furnaces, for annealing, carburizing, normalizing, enameling, nitriding, hardening, drawing, forging, billet heating and process heating; also specially built gantry cranes, charging machines and other labor saving material handling equipment used in connection with furnaces; samples of chain belt conveyor, cast metallic heating elements, roller rails and miscellaneous other parts used in these furnaces. In attendance: F. T. Cope, general manager and chief engineer; R. F. Benzinger, vice-president; S. F. Keener, sales manager; N. H. Knowlton, assistant sales manager; M. H. Mawhinney, fuel furnace engineer; A. H. Vaughan, assistant chief engineer; G. P. Lozier, superintendent; S. J. Eberwein, assistant superintendent; R. C. Oyster, chief designer; A. F. Kingsley, chief draftsman; A. E. Wright, advertising manager; C. L. West, K. U. Wirtz, W. S. Bowling, sales engi-



H. G. KESHIAN
Chase Companies, Inc.
Chairman, New Haven
Chapter



M. G. JEWETT
Chain-Belt Co.
Chairman, Milwaukee
Chapter



C. G. WERSCHIED
E. W. Bromwich Supply
Co.
Chairman, St. Louis
Chapter



WILLIAM HAGUE
Arter Grinding Co.
Chairman, Worcester
Chapter

neers; T. B. Bechtel, Chicago district representative; F. J. Peterson, B. C. Thompson, R. D. Thomas, Detroit district representatives; W. M. Smith, eastern sales representative.

Electric Steel Founders' Research Group, Chicago. Booth 39-B. Miscellaneous small and medium-sized castings of carbon or common steels, and alloy or special steels, as made regularly in research group foundries, from metal produced in electric furnaces; plant views, physical test specimens, and other details indicative of group plant practices. In attendance: R. A. Bull, director; C. N. Ring, assistant director.

F

R. Y. Ferner Co., Washington, D. C. Booth 14.

Equipment made by the Societe Genevoise d'Instruments de Physique, of Geneva, Switzerland, including latest type of Swiss jig boring machines, size 4B; also universal measuring machines, 20-in. capacity, and the latest type of micro-indicator support for the measurement of steel balls; other measuring equipment includes a micro-indicator support type U-2 and a new one, type U-3, for the measurement of various metal parts; also the line of Dilatometers made by the S. A. de Commentry-Fourchambault et Decazeville of Imphy, France; including one of its thermal analysers, a recording instrument for showing the expansion of a test specimen in comparison with a standard in an electric furnace giving temperatures up to 1000 deg. C. In attendance: R. Y. Ferner, United States and Canadian representative; Charles T. Ameel, S. E. Kenworthy, W. E. Bailey, demonstrators; Lambert G. Neff, A. W. Bissell, Chicago representatives; Walter S. Ryan, Detroit representative.

Ferry Cap & Set Screw Co., Cleveland. Booth 2-L.

Cap screws; set screws; milled studs; standard and special screws and bolts in alloy steels; connecting rod bolts; cylinder head bolts; flywheel bolts; king bolts; tie rod bolts; hardened and ground parts; Ferry patented acorn nuts, covered and semi-covered. In attendance: H. D. North, vice-president and sales manager; Herbert A. Keith, H. B. Pulsifer, metallurgist, Cleveland; A. L. Whittemore, W. J. Graham, Chicago; W. M. Leach, Detroit.

A. Finkl & Sons Co., Chicago. Booth 2-D.

Exhibiting: Pictures of plant operations, forgings, etc.; also a Neon electric sign representing a die block. In attendance: C. E. Finkl, general manager; Fred Finkl, works manager; William Finkl, M. R. Chase, metallurgical engineer; E. H. Graham, Detroit district representative; T. P. Wallace, Cincinnati district representative; W. H. Rieger, Pittsburgh district representative; J. M. Curley, New England district representative; H. Berg, New England district representative.

Firth-Sterling Steel Co., McKeesport, Pa. Booth 37-D.

Materials entering into the manufacture of tungsten carbide at various steps of the process; also representative tools of tungsten carbide; photographs of typical operations with Firthite, Circle C high-speed steel and Cromovan triple die steel; a motor-driven device showing the comparative cutting speeds (average) of high-speed steel, super high-speed

steel and tungsten carbide tools. In attendance: L. G. Firth, general manager; D. G. Clark, director of sales; G. J. Comstock, director of research; O. K. Parmiter, metallurgical engineer; R. S. Stevick, works manager; A. S. Martin, manager, engineering department; M. F. Judkins, Firthite department; Frank Marth, assistant works manager; C. G. Thoma, advertising manager; O. T. Smith, Boston district manager; H. I. Moore, Hartford district manager; A. E. Barker, New York district manager; W. C. Royce, Cleveland district manager; G. A. Jacobs, Detroit district manager; E. T. Jackman, Chicago district manager; W. J. MacFarland and J. V. Little, Philadelphia office.

J. B. Ford Co., Wyandotte, Mich. Booth 26.

Glass tanks showing methods for agitating metal cleaning solutions by air; samples of metal cleaners. In attendance: B. N. Goodell, W. M. Cole, C. S. Tompkins, C. R. Beaubien, H. W. Faint, all of the industrial department.

Fusion Welding Corporation, Chicago. Booth 106.

New applications, welding equipment and supplies developed by the company's research department during the past year; Weldite welding rods for both gas and electric welding; the Fuzon line of arc welding generators. In attendance: J. B. Green, president; L. F. Collins, sales manager; Dana Summers, general superintendent; R. W. Holt, research engineer; F. A. Green, eastern district manager; M. P. Hare, Southwest district manager; R. O. Waldman, Western district manager; A. Bernard, sales engineer; R. F. Beazell, sales promotion.

G

Gathmann Engineering Co., Baltimore. Booth 33-B.

Gehrich Oven Co., Inc., Long Island City, N. Y. Booth, Gas Section.

Small continuous conveyor oven for automatic dip, drain and bake of finishes on variety of metal parts; elaborate pictorial display of ovens for baking finishes, low temperature heat treating, core baking, etc.; the new Gehrich oven book will be distributed. In attendance: C. L. Gehrich, president; A. V. Maday, vice-president; H. P. Rasmussen, manager, Chicago district; H. Gehrich, New York, and P. Kriegel, advertising manager.

General Alloys Co., Boston. Booth 22.

Nickel chrome alloy, "Q-Alloys"; carburizing and annealing containers; cyanide and lead pots; furnace hearths, roller rails, heat and acid resisting chain, cyanide dipping baskets, recuperators, miscellaneous furnace parts, parts for every type heat treating furnace—carburizing, annealing, normalizing, hardening, tempering, forging, spheroidizing; tubes and retorts. In attendance: H. H. Harris, president; W. K. Leach, general manager; G. C. McCormick, chief engineer; F. J. Blaney, general superintendent; W. R. Blair, E. E. Armory, engineering department; H. G. Chase, manager furnace parts division; R. M. Kirk, manager New York branch; Ralph Hare, New England representative; A. L. Grinnell, manager Detroit branch; E. R. Dougherty, manager Chicago branch; R. W. Herrick, Chicago branch; J. J. Donovan, Chicago branch;



GEORGE J. O'NEILL
Pennsylvania Gas &
Electric Co.
Chairman, York Group



CHESTER HACKING
Wm. H. Haskell Mfg. Co.
Chairman, Rhode Island
Chapter

C. P. Mills, director chrome alloy department; J. C. Van Arman; Braun, a dog; Jerry, another dog; three airplanes.

General Electric Co., Schenectady. Booth 80.

Box type heat treating furnace; Air-Draw furnace (vertical cylindrical type); Air-Draw oven (box type); melting pot for white metals; lead hardening furnace (vertical cylindrical type); samples of copper brazed steel parts; portable Battledock floor welder and control; atomic hydrogen arc welding equipment for hand welding; automatic atomic hydrogen arc welding equipment; portable semi-automatic welding equipment; ammonia dissociators; 500 ampere multiple-operator constant-potential arc welding set; General Electric Co. welding electrodes. In attendance: F. W. McChesney, C. L. Ipsen, H. J. Babcock, G. E. Messer, R. E. Welton, H. E. Scarborough, H. E. Lewis, G. R. Brophy, F. C. Kelly, R. H. Harrington, Leroy Wyman, E. N. Downing, P. P. Alexander, J. W. Belanger, E. Vom Steeg, Jr., H. O. Westendarp, J. A. McCullough, E. A. Swiedom, H. P. Doud, M. A. Havenhill, J. W. McFarland, F. Klass, F. V. Wenzell, F. S. Peasley, W. M. B. Brady, R. C. Anderson, O. A. Tilson, V. J. Chapman, I. F. Weller, R. M. Stephens, B. C. Tracey, L. D. Meeker.

General Electric X-Ray Corporation, Chicago. Booth 15-B.

Radiographs showing how X-rays have been successfully employed in the inspection of high pressure fittings as well as a means of correcting foundry practices also, a series of Laue diffraction patterns showing the effect of different types of rolling of sheet metal and the effect of various heat treatments. In attendance: E. W. Page; W. C. Dee; S. Nielson; E. E. O'Donnell; and W. B. Andrews.

General Spring Bumper Corporation (Division of Houdaille-Hershey Corporation, Detroit. Booth 4-F.

Polishing wheel set-up machine as substituted for old method of hand set-up. In attendance: Charles F. U. Kelly, vice-president Houdaille-Hershey Corporation; B. M. Short, vice-president General Spring Bumper Corporation; F. A. Cornell, vice-president Houde Engineering Corporation; J. B. O'Neill, special representative Houdaille-Hershey Corporation; C. G. Griffiths, special representative General Spring Bumper Corporation; R. R. Tompkins, special representative Houde Engineering Corporation.

Globar Corporation, Niagara Falls. Booth 53.

High temperature electric furnace equipped with Globar electric heating elements and terminal accessories, furnace chamber temperature to be maintained at 2450 deg. Fahr. In attendance: A. H. Heyroth, general manager; K. E. Rogers, sales manager; B. A. Bovee, chief engineer; L. C. Loshbough, N. H. Berry, W. S. Evans, engineers.

Claud S. Gordon Co., Chicago. Booth 34-D.

Pyrometer accessories, including thermocouples, switches, lead wire, protecting tubes, insulators and other accessories of a special nature and design for regular and special application. In attendance: Claud S. Gordon, president; A. W. Anderson, superintendent; Richard Schoenfeld, sales manager; S. A. Silbermann, Indiana district representative.

Gray Iron Institute, Inc., Cleveland. Booth 45-B.

Test bars of various types of gray cast iron, engineering data, results of various investigations. In attendance: Arthur J. Tuscany, manager; Charles E. Mitchell, associate manager.

Great Lakes Forge Co., Chicago. Booth 20-D.

All types of drop forgings ranging in weight from 1 oz. to 100 lb. each; typical drop forge dies, showing various operations required to make drop forgings. In attendance: G. C. Hodgson, president; W. C. West, vice-president; C. A. Lamb, general manager; A. M. Steever, metallurgical engineer; R. J. Geisler, sales department.

H

George J. Hagan Co., Pittsburgh. Booth 47.

Complete description of all types of industrial furnaces, including designs, photographs and performance data on many new and improved types of heat treating equipment. In attendance: R. E. Talley, president; C. F. Cone, engineer; V. A. Hain, district manager; J. Sandberg, district manager; A. D. Dauch, engineer.

Halcomb Steel Co., Syracuse, N. Y. Booth 28-B.

Corrosion and heat-resisting steels and alloys and examples of uses; also all grades of tool steels from ingot to finished bar. In attendance: R. H. Dougherty, assistant to president; H. A. Pardee, general manager; J. T. Leyden, service metallurgist; H. J. Stagg, assistant manager; H. L. Day, metallurgist; J. H. Hinkley, Chicago branch manager; J. F. Kirwan, Cleveland branch manager; H. O. Lang, Detroit branch manager.



H. J. FISCHBECK
Pratt & Whitney Aircraft
Corporation
Chairman, Hartford
Chapter



H. J. CUTLER
Bethlehem Steel Co.
Chairman, Buffalo
Chapter

Hauck Mfg. Co., Brooklyn. Booth 12-A.

New Hauck Micro-Vernier oil regulating valves in four sizes; the new Hauck Venturi triple atomizing low pressure oil burners in four sizes. In attendance: Jules Escherman, manager Chicago office; C. Stockman and F. Schweigerdt, representatives.

C. I. Hayes, Inc., Providence, R. I. Booth 38.

High-speed steel hardening furnace equipped with the Hayes patented atmosphere control. In attendance: Carl I. Hayes, president; James E. Hines, vice-president and sales manager; Carl G. Paulson, sales engineer; and Charles H. Myrick, metallurgist.

Haynes Stellite Co., Kokomo, Ind. Booth 82.

Display of Haynes Stellite cutting tools, welding rod and special castings; Haystellite, cast tungsten carbide; Haschrome self-hardening welding rod; Hastelloy castings—a new corrosion resistant alloy; demonstration of "Haynes Stellite" process—deposition of Haynes Stellite welding rod on wearing surfaces to prolong life of parts. In attendance: E. F. Smith, Chicago district sales manager; W. A. Becker, F. P. Shephard, sales engineers.

Heppenstall Co., Pittsburgh. Booth 7-L.

Heppenstall catalogs for all interested in high grade alloy steels, die blocks, trimmer steels, solid steel four cutting edge shear knives, and heavy forgings—both carbon and alloy steel. In attendance: C. W. Heppenstall, president; B. B. Weinberg, vice-president; D. A. Stuart, in charge of booth; F. C. Moyer, Detroit representative; J. A. Succop, research engineer; A. L. Wurster, Philadelphia special representative; G. I. Allen, Cleveland representative; L. A. Daines, Chicago representative; Mielke & Bemm, Milwaukee representatives; A. J. Porter, Jr., sales manager, Heppenstall Co., Bridgeport; C. J. Sauer, vice-president, Heppenstall Co., Bridgeport; G. O. Desautels, Indianapolis representative; O. W. Mueller, Buffalo representative.

Hevi Duty Electric Co., Milwaukee. Booth 79.

Electric vertical pressure carburizing furnace with complete temperature control and carburizing gas mixing machine; pot type furnace for hardening and drawing operations; small box type furnace with electro-magnetic winding for determining the AC₁ point of steel; small pot type furnace with electro-magnetic winding for determining AC₂ point of steels submerged in cyanide bath; box type tool room furnace with electro-magnetic winding for determining the AC₁ point of steel. In attendance: E. L. Smalley, president; F. A. Hansen, general manager; W. B. Cooley, sales manager; E. R. Brandau, Detroit district manager; F. J. Condit, Buffalo district manager; J. S. Ayling, Cleveland district manager; L. W. Hayden, Philadelphia district manager; E. G. Craig, New York district manager; C. H. Stevenson, Chicago district manager; H. L. Dunn, St. Louis district manager; F. Bathke, St. Paul district manager.

Holcroft & Co., Detroit. Booth 49.

Photographs, blue prints and catalogues of heat treating furnaces. In attendance: C. H. Martin, Chicago district man-



G. V. LUERSEN
Carpenter Steel Co.
Chairman, Lehigh
Valley Chapter



EDWIN F. CONE
THE IRON AGE
Chairman, New York
Chapter

ager; B. Linsay, Detroit sales engineer; C. L. Joy, engineer; and R. T. Cadwell, vice-president.

Hoskins Mfg. Co., Detroit. Booth 30.

Small electric box type furnace with Chromel ribbon units, equipped with automatic temperature control; display of Chromel resistance wire and ribbon; indicating pyrometers. In attendance: C. F. Busse, salesman; F. D. Archer, salesman; C. S. Kinnison, advertising manager; W. D. Little, sales manager; W. A. Gatward, chief engineer.

E. F. Houghton & Company, Philadelphia. Booth 35-B.

Latest developments of Houghton research in the field of carburizing materials, quenching and tempering oils, liquid heating media for hardening or tempering, cutting oils, rust preventives, pickle controls, etc. In attendance: G. W. Pressell, general sales manager, Philadelphia; H. E. Cressman, assistant general sales manager, Chicago; G. S. Rogers, assistant general sales manager, St. Louis; Wilbur J. Wright, Cleveland; R. S. Crowell, F. J. Elliott, Reese Nelson, E. H. MacInnes, E. H. Kellogg, M. B. Skipper, W. L. Spencer, H. W. Vanderwall, Carl Wickbom.

Hyro Mfg. Co., Inc., New York. Booth 77.

One No. 10 Hyro automatic industrial furnace, for case hardening by cyanide and other salts, heat treating, etc. In attendance: Charles J. Martin.

Illinois Steel Co., Chicago. Booth 12-B.

USS chromium steel, 12-14; USS chromium steel, 16-18; USS chromium-nickel steel, 18-8; in plates, structural shapes and bars. In attendance: W. I. Howland, Jr., assistant general manager of sales; R. Korsan and S. L. Graham, assistant managers of sales; G. A. Price and J. B. Hammond, general sales office; R. G. Glass and F. S. Crane, assistant managers, department of metallurgy and inspection; George Bendell, Fred Bendell, E. Davidson, George Fisher and F. B. Mulvaney, assistant engineers; C. R. Moffatt, advertising manager; A. R. Willard, assistant manager of sales, Cleveland; H. W. Parker and W. S. Saylor, Cleveland salesmen; J. H. McKown, assistant manager of sales, Detroit; John Hornbrook and G. W. Landrus, Detroit salesmen; E. E. Price, Buffalo; Carl A. Sudor, St. Paul.

Illinois Testing Laboratories, Inc., Chicago. Booth 26-D.

Stationary and portable indicating pyrometers for heat-treating furnaces, draw furnaces and metal baths and general use; portable Pyro Lance for measuring the temperature of molten nonferrous metal; portable Thermo Lance for annealing ovens and furnaces; thermocouples; pyrometer accessories. In attendance: J. A. Obermaier, engineer in charge; M. D. Pugh, sales manager; C. L. Schmal, representative.

Illinois Tool Works, Shakeproof Lock Washer Company, Wedge Lock Tool Company, Chicago. Booth 10-L.

Variety of metal cutting tools, lock washers and locking terminals, tool holders, vises and clamps. In attendance: Harold C. Smith, president; F. W. England, vice-president; C. L. Johnson, treasurer; P. J. Nelson, sales manager, Illinois; tools; J. M. Gribble, sales manager, Shakeproof washers; C. J. Irwin, superintendent; S. O. Bjornberg, con-

sulting engineer; A. W. Swanson, R. P. Leiner; J. LaBuda; E. E. Vally; F. W. Dority; Wm. Holly; A. W. Long; W. V. Klimmer.

International Nickel Co., Inc., New York. Booth 10-D.

Typical examples of industrial applications of nickel and nickel alloys; members of our development and research department will be in attendance to discuss the production or application of these products. In attendance: T. H. Wickenden, C. McKnight, A. L. Roberts, F. B. Coyle, J. S. Vanick, A. G. Zima, H. J. French, J. W. Sands, R. L. Suhl, R. Cooper, Jr., W. C. Kerrigan, R. A. Wheeler, H. S. Lewis, E. J. Bothwell, F. H. Villaume.

IRON AGE PUBLISHING CO., New York. Booth 2-B.

Copies of THE IRON AGE and reprints of the advertising and editorial section will be distributed to visitors and exhibitors on request. In attendance: F. J. Frank, president; W. W. Macdon, editor; E. F. Cone, associate editor; S. G. Koon, associate editor; R. E. Miller, editorial staff; R. A. Fiske, Chicago editor; F. L. Prentiss, Cleveland editor; Burnham Finney, Detroit editor; T. H. Gerken, Pittsburgh editor; C. S. Baur, general advertising manager; H. E. Leonard, Oliver Johnson, B. H. Hayes, advertising department; F. S. Wayne, Western representative; W. B. Robinson, Pittsburgh representative; Emerson Findley, Central Western representative; Charles Lundberg, Philadelphia representative; B. L. Herman, Western New York State representative; Peirce Lewis, Detroit and Cincinnati representative; D. C. Warren, New England representative; W. C. Sweetser, New Jersey representative; C. H. Ober, New York representative; A. H. Dix, subscription manager.

Ellwood Ivins' Steel Tube Works, Philadelphia. Booth 36-D.

Seamless chrome-molybdenum tubing, seamless stainless steel tubing, low and high carbon seamless steel tubing and also seamless aluminum and duralumin tubing; some in very small sizes, such as 0.012 in. O. D. In attendance: Ellwood Ivins, president; Horace S. Kircher, vice-president; J. B. Cording, treasurer; Stanley Jeffries, metallurgist.

J

Jessop Steel Co., Washington Pa. Booth 47-B.

Tool steel bars, samples of finished tools made from our products; sheet steels of tool steel quality for all kinds of saws; also finished saws of various descriptions; rustless steel bars, sheets, plates and strips; articles made up of rustless steel to illustrate the various uses and applications; die steels and finished dies. In attendance: S. A. Grayson, president; R. E. Emery, vice-president; F. T. H. Youngman, secretary and treasurer; R. J. Murray, II, assistant secretary; R. E. Malmberg, metallurgist; district sales managers: A. C. Graham, Chicago; D. J. Hanna, Detroit; V. M. Wellman, Cleveland; R. M. Paxton, Jr., New York; A. W. Lucas, Hartford, Conn.; district representatives: W. J. Frederick, Cincinnati; M. W. Singer, Boston; J. S. Marlowe, Indianapolis; J. C. Dawson, A. G. Lambert, Toronto.

Johnston Mfg. Co., Minneapolis. Booth 12.

Valveless automatic controller for metering in full operation heavy, viscous fuels; four sizes of reverse blast low-pressure burners for metal heating furnaces; oil-fired blacksmith forge, an efficient substitute for the coal burning forges. In attendance: W. E. Johnston, president; Otis B. Duncan, Chicago; A. L. Datesman, Chicago; J. R. Matthews, Detroit.

Jones & Laughlin Steel Corporation, Pittsburgh. Booth 3-L.

Samples of cold-finished steel and Jalcas steel in both hot-rolled and cold-finished; a specially prepared series of panels which include large original oil paintings of Bessemer and open-hearth steel making scenes made within the J. & L. works at Pittsburgh and Aliquippa, Pa. In attendance: J. Davis Allen, manager sales, cold-finished department; C. D. Burns, assistant manager sales, cold-finished department; R. T. Rowles, manager sales, hot-rolled department; A. A. Wagner, assistant manager sales, hot-rolled department; M. A. Blessing, district sales manager, Chicago.

K

K-G Welding and Cutting Co., Inc., New York. Booth 104.

Oxyacetylene welding and cutting apparatus. In attendance: W. D. Flannery, vice-president; A. W. Carr; F. O. Weber; H. H. Kress.

Keller Mechanical Engineering Corporation, Brooklyn. Booth 8-A.

Kellerflex flexible shaft machine; a new auto body sanding and polishing machine on small roller floor stand with right angle sanding and polishing equipment; a new high-speed





IVAN L. JOHNSON
Best Steel Casting Co.
Chairman, Golden Gate
Chapter



F. L. MEACHAM
Frigidaire Corporation
Chairman, Dayton
Chapter

flexible shaft machine for shaft speeds direct into the handpiece, 15,000 r.p.m.; an entirely new machine equipped with two shafts; one for heavy work at slow speed and one for light work at high speed. In attendance: H. P. Loewenberg, P. C. Renno, W. M. Rieman, J. J. Walsh.

J. W. Kelley Co., Cleveland. Booth 12-D.

Acid inhibitor for the pickle bath and drawing compound for rustless steel, and other metal-working products. In attendance: J. W. Kelley, president; J. E. Burns, vice-president; H. B. Northrup, secretary; C. F. Boyd, H. M. Webb, E. C. Redlin, B. O. Platell, sales representatives.

Kelley-Koett Mfg. Co., Inc., Covington, Ky. Booth 8-F.

X-ray equipment for industrial enterprises. In attendance: J. R. Kelley, president; W. S. Werner, chief electrical engineer and secretary; C. A. Poole, industrial research engineer; E. B. Graves, electrical engineer; G. M. McFedries, manager of Chicago branch.

C. M. Kemp Mfg. Co., Baltimore. Booth, Gas Section.

Improved Kemp system for efficient utilization of gas for industrial process heating; gas fired immersion metal melting equipment; burner equipment for all types of industrial heating operations. In attendance: E. B. Dunkak, William Hunt, W. S. Bassett and F. H. Andrews.

Charles F. Kenworthy, Inc., Waterbury, Conn. Booth 28-D.

Kinite Corporation, Toledo. Booth 3-B.

Kinite tool steel castings; Ironite alloy iron castings; patterns; stampings; Kinite steel bars; finished Kinite dies and molds. In attendance: R. H. Herbst, superintendent; W. G. Salkeld, sales manager; F. E. Spartz, plant manager.

Charles Kleist & Son, Jamestown, N. Y. Booth 24-D.

A miniature board hammer and a display of drop hammer boards of the standard type; special built-up type; laminated hammer boards and ram pins, manufactured of selected hard maple lumber. In attendance: H. E. Kleist, sales manager.

Kloster Steel Corporation, Chicago. Booth 21-Ba.

Samples of "Pure-Ore" Swedish steels of every description, including special alloy steels for the most varied purposes—chrome-nickel, chrome-vanadium, tungsten, cobalt and molybdenum steels; tool steel for all purposes, cutlery steel, hot and cold-rolled strip steel, band saw steel, ball-bearing steel, ball steel, razor blade steel, magnet steel, file steel, spring steel, clockspring steel, beveled shoe knife steel, knife steel, rolled figured steel, sectional steel, wire rods, rolled wire, skate steel, band iron, hollow staybolt iron, solid staybolt iron, charcoal pig iron. In attendance: Einar Lindeblad, general manager, and Max Weisner, sales representative.

L

Leeds & Northrup Co., Philadelphia. Booth 5.

Demonstration of Potentiometer principle, showing balance method of measuring industrial temperatures; anticipating Potentiometer control equipment; indicating and recording Potentiometer pyrometers in vapor-proof cases; recording controllers; checking Potentiometers; Hump hardening furnace, Homo nitriding furnace and Homo tempering furnace; model furnaces demonstrating Hump and Homo

methods. In attendance: G. W. Tall, sales manager, pyrometer division; A. E. Tarr, Jordan Korp, E. H. Carlson, W. A. Lane, T. C. Smith, J. A. Dow, H. F. Coyle, E. Bentzen, C. O. Anderson, H. Brewer, sales manager, furnace division; E. B. Estabrook, P. H. Taylor, A. F. Moranty, O. Brewer, E. C. Wahl, W. D. Trueblood, R. E. Hansen, T. C. Bennett and M. B. Fisher.

E. Leitz, Inc., New York. Booth 1-L.

The new Leitz Micro-Metallograph, a new Darkfield illuminator, affording a means for examining metal specimens; a complete line of grinding and polishing machines, including the Guthrie-Leitz grinding and polishing machine for metallographic specimens with automatic (magnetic) specimen holder; the Leitz Metallurscope, which serves as a portable metal microscope for both routine and research work. In attendance: R. Tvestmann, factory superintendent; O. Soetbeer, technical representative, and A. I. Buehler, Chicago representative.

Lincoln Electric Co., Cleveland. Booth 90.

Exhibiting (in operation): A complete line of polyphase induction motors, booth sleeve and ball bearings, both open and fully inclosed fan cooled; Lincoln push button starter for sizes up to motors of 30 hp. capacity; Lincoln Lincoln-Weld motor operating under water; an Electronic tornado machine for carbon arc welding; Stable-Arc hand welding equipment in several sizes; Fleet-Weld, Stable-Arc, Light-Weld, Kathode and Stain-Weld electrodes; complete line of samples welded with the above electrodes. In attendance: A. F. Davis, vice-president; R. A. Davidson, district manager, Chicago; H. M. Downing, F. O. Erickson, John C. Ardagh, H. F. Nye and A. E. York.

Lindberg Steel Treating Co., Chicago. Booth 16-D.

A booth for the entertainment of exposition visitors. In attendance: A. N. Lindberg, president; L. A. Lindberg, vice-president and works manager; E. C. Kohler, treasurer; P. J. Norton, metallurgist; H. E. Lindberg, estimating engineer; B. C. Cleveland, sales manager.

Linde Air Products Co., New York. Booth 82.

A complete line of oxyacetylene welding and cutting equipment, including both low pressure and pressure types (trade names, Oxweld, Prest-O-Weld, Purox, Prest-O-Lite). Welded specimens tested in Oxweld tensile strength testing machine. In attendance: H. F. Bulkley, T. C. Fethers-ton, H. H. Griffith, R. Tull, D. J. Hayden, M. Burnett, C. E. Ziesel, M. Wade, W. B. Browning, F. C. Hasse, J. B. Dunlop, J. W. Haygood.

Ludlum Steel Co., Watervliet and Dunkirk, New York. Booth 7-B.

L-XX high-speed steel, Deward, Huron and Utica die steels, Seminole chisel steel and Pompton carbon tool steels; various applications of these steels illustrated by numerous tools and dies; Strauss Metal (tungsten carbide) tools also on display. In attendance: A. F. Dohn, vice-president and general manager of sales; C. B. Templeton, assistant to president; F. B. Lounsbury, vice-president and manager, Dunkirk plant; Harry Hardwicke, Chicago district sales manager; W. G. Zetsche, Edwin Oeser, R. E. Surtees, salesmen, and W. H. Wills, metallurgist, Dunkirk plant.

M

Madison-Kipp Corporation, Madison, Wis. Booth 1.

A new size automatic die casting machine; also Kipp air grinders and accessories. In attendance: A. T. Lillegren, sales manager; T. E. Coleman, president; J. A. Coleman, vice-president; J. A. Courter, Eastern sales manager; A. S. Kidd, superintendent; T. C. Korsmo, chief engineer, die casting division; F. R. Clark, chief draftsman; R. Schultz, die casting machine expert.

Paul Maehler Co., Chicago. Gas Section.

Maehler universal gas-fired direct connection heater for tempering, drawing, normalizing, mold and core baking; Maehler electrical control cabinet and automatic temperature and safety controls. In attendance: A. E. Maehler, general manager; H. R. Madson and H. R. Fox, sales engineers.

Mahr Mfg. Co., Minneapolis, Minn. Booth 60.

A model belt conveyor furnace as a means of displaying photographs and photostats of Mahr industrial furnace installations; also the latest improved Mahr individual, direct connected blowers, and the new Mahr triple atomizing type burner, Mahr safety automatic shut-off valves, and other auxiliary equipment. In attendance: W. G. Barstow, vice-president; C. F. Olmstead, assistant sales manager; B. G. Harmon, Chicago branch manager; C. W. Rudolph, Chicago district representative; A. E. Stenzel, Detroit district representative, and A. F. Tenney, Ohio representative.



Marburg Brothers, New York. Booth 21.

A Thiel precision die sawing and filing machine which substitutes for drilling, shipping and filing operations in making dies, jigs, punches, cams, templates, etc. In attendance: Theodore H. Marburg, president; O. P. Brett, Richard Krause and F. Wenzel.

Maxon Premix Burner Co., Muncie, Ind. Gas Section.

Industrial fuel burning equipment consisting of blower type gas burners, inspirating type gas burners, motor-driven automatic control valves, and solenoid safety valve. In attendance: R. W. Jackson, engineer.

Metal & Thermit Corporation, Chicago. Booth 101.

Samples of heavy sections which have been Thermit welded. In attendance: H. D. Kelley, district manager, Pittsburgh; C. D. Young, district manager, Chicago; A. F. Beaulieu, Chicago.

Michiana Products Corporation, Chrobalitic Division, Michigan City, Ind. Booth 36-B.

Fire Armor heat resisting containers; carburizing and annealing boxes; cyanide, lead and salt pots; tubes and re-torts; dipping baskets; Fire Armor and Zorite furnace parts, grids, muffles, rails, hearths, furnace parts and fixtures; sheets, fabricated shapes, etc. In attendance: W. B. Sullivan, vice-president and general manager; H. Klouman, superintendent; L. H. Whiteside, Chicago representative; A. A. Cash, Detroit branch; J. F. Sweeney, New York; C. M. Conner, Philadelphia; E. E. Whiteside, Cleveland, and J. W. Mull, Jr., Indianapolis.

Michigan Steel Casting Co., Detroit. Booth 3.

A model furnace demonstrating the use of Misco chain and Misco furnace parts for conveying material through heating and heat-treating furnaces; various types of standard and special Misco chains for industrial furnace use; several designs of Misco corrugated trays for pusher furnace work; Misco seamless thermocouple protection tubes; Misco sheet carburizing boxes; Misco sheet dipping baskets and other fabricated dipping racks, fixtures, etc.; Misco fixed axle type roller rail; a replaceable wearing strip (roof patented type) rolling mill twist guide with Misco insert. In attendance: F. J. Stanley, secretary and general manager; E. D. Flinterman, sales manager; J. D. Corfield, sales engineer; Ralph T. Crean, Chicago representative, and W. E. McGahey, sales representative.

Midvale Co., Philadelphia. Booth 22-B.

Forgings; heat resisting and corrosion resisting castings; tool steels. In attendance: Dr. H. L. Frevert, vice-president in charge of operations; Stuart Hazlewood, vice-president in charge of sales; Henry Ziesing, manager of sales; Francis B. Foley, research engineer; Howard Myers, engineer of tests; A. Hamilton, engineer, heat and corrosion resisting castings; H. E. Rowe, manager, bar steel sales; Frank Sleath, service department; Fred Sager, manager of sales, Chicago; W. B. Smyth, manager of sales, Cleveland; Le Roy Berkey, Cincinnati; T. G. Besom, New York, and J. R. Adams, superintendent, special products.

Alexander Milburn Co., Baltimore. Gas Section.

A. Milne & Co., New York. Booth 5-B.

Milne tool and die steels; hollow, solid and auger drill steels; special sections; MR Swedish Lancashire iron; Swedelac cold drawn electrical iron; Nohab anvils; forged tools; Wardlow's file steel; Wardlow's cutlery sheets; Reynold's aircraft tubing; Prince ball bearing steel; capillary tubing for Diesel engines. In attendance: Henry Sears Hoyt, member of the firm; V. A. Greene, general sales manager; H. R. Adams, manager, Chicago branch; W. McIlwrath and Miss M. Truett.

Minneapolis-Honeywell Regulator Co., Minneapolis. Booth 1-B.

Motor operated valves for fuel-air control of industrial furnaces; damper regulating motors; motor operated automatic shut-off valves for low pressure oil and gas service; motor operated final safety shut-off valves for higher pressure application; motorized standard regulating valves; solenoid operated valves; electric contact temperature controllers; electric contact pressure controllers; combustion safety controllers; relays of small capacities; automatic thermostatic controls for unit heaters. In attendance: R. L. Goetzenberger, manager, industrial regulator department; W. G. Jennings, manager, Chicago office; R. G. Taylor, industrial sales engineer, Chicago; J. E. Kelly, industrial sales engineer, Detroit; L. H. Plum, industrial sales engineer, Philadelphia; J. E. Haines, industrial sales engineer, New York; J. S. Gaines, industrial sales engineer, Milwaukee, and Paul F. Shivers, engineer, research and development.

Modern Engineering Co., St. Louis. Booth 107.
Complete line of Meco welding and cutting equipment; demonstration of the Meco Multi-



A. L. SHIELDS
Westinghouse Electric &
Mfg. Co.
Chairman, Springfield
Chapter



H. L. HOPKINS
Case School of Applied
Science
Chairman, Case Group

Seat Regulator equipped with the safety check valve; display of the type X Super Welding Torch and flame qualifications; demonstration of special machine cutting tools. In attendance: A. J. Fausek, president; I. F. Fausek, general sales manager; John J. Keane, territorial sales manager; Walter Smith, Chicago representative, and W. J. Lacey, merchandise manager.

Molybdenum Corporation of America, Pittsburgh. Booth 8-L.

Products of tungsten and molybdenum, including ferroalloys and salts; also the chemical products of these two products, including sodium molybdate, sodium tungstate, ammonium paratungstate, ammonium molybdate. In attendance: Clifton Taylor and W. H. Phillips.

Morse Twist Drill & Machine Co., New Bedford, Mass. Booth 31-B.

Regular high-speed and carbon twist drills, reamers, milling cutters, taps and dies; also various special tools. In attendance: W. T. Read, vice-president and treasurer; F. O. Lincoln, vice-president in charge of sales; J. Gordon Barr and B. F. Mansur.

N

New Jersey Zinc Co., New York. Booth 1.

A variety of finished products made principally of die cast parts, besides an exhibit of unassembled die castings; this exhibit of assembled products, including several in operation, will well illustrate the variety of finishes in which parts die cast of alloys of high grade zinc are now produced. In attendance: F. C. Fuller, manager of metal and chemical division; W. P. Hardenbergh, Jr., assistant manager, metal and chemical division; R. M. Neumann, Western sales manager; J. W. Matthias, assistant Western sales manager; R. M. Curtis, S. E. Maxon, C. R. Maxon, R. Davison and R. L. Davis.

Northwestern Mfg. Co., Milwaukee. Booth 93.

Hansen arc welder operated by electric motor; also the new Hansen electric arc welding torch, for welding or brazing either steel or copper, or aluminum, by the use of a filler rod. In attendance: W. J. Altken, secretary-treasurer; E. C. Caluwaert, advertising manager; K. L. Hansen, welding engineer; Kjel Franzen, demonstrator; W. F. Johnson, R. G. Mason, representatives.

Norton Co., Worcester, Mass. Booth 6.

Alundum grinding wheels; Crystolon grinding wheels; Norton refractories. In attendance: H. K. Clark, district manager (wheel division); R. W. Cornish, sales representative (wheel division); K. H. Bird, W. H. Henson, refractories sales representatives; F. H. Stenberg, publicity department, Worcester.

O

Ohio Steel Foundry Co., Springfield, Ohio. Booth 26-B.

A centrifugally cast alloy tube; cast and sheet Fahrte carburizing containers; centrifugal roll and other Fahrte alloy castings. In attendance: W. J. Gilmore, vice-president; F. K. Ziegler, manager, alloy division; J. F. Monfils, sales manager, alloy division; D. W. Talbott, W. A. Toohill and Frank Morrow, sales engineers.

Tinius Olsen Testing Machine Co., Philadelphia. Booth 25-B.
Latest types of Olsen direct motor-driven Brinell hardness



tester; ductility testing machine equipment for sheet metal; universal tensile testing machine with automotive drive; latest type of Olsen-Lundgren dynamic balancing machine for balancing rotating parts, as well as the Olsen-Lundgren static balancing machine for balancing rotating parts statically. In attendance: R. B. Lewis, H. H. Gildner, Bruce L. Lewis and J. Millane.

P

Page Steel & Wire Co., New York. Booth 78.
Complete line of Page welding wires. In attendance: J. J. Flaherty, E. J. Flood.

Park Chemical Co., Detroit. Booth 4-B.
A complete line of hardening and heat treating materials, including case hardening compounds, cyanide mixtures, drawing salts, lead pot carbon, cleaning compounds, etc. In attendance: J. N. Bourg, vice-president and general manager; F. W. Faery, Jr., and J. C. Thompson, sales representatives.

Henry Pels & Co., Inc., New York. Booth 20.

Permutit Co., New York. Booth 2.

Pittsburgh Instrument & Machine Co., Pittsburgh. Booth 24.
Brinell testing machines, hand- and power-operated; metal sheet testers; metallographic grinder; Brinell calibrator; Brinell microscope; depth indicator for Brinell tests; direct reading instrument for Brinell machines; Diamo-Brinell Tester, special, with two millimeter steel ball and diamond indenter. In attendance: Paul Kammerer and Charles Truog.

Pressed Steel Co., Wilkes-Barre, Pa. Booth 44-B.
Rezilast Lite-Wate carburizing and annealing containers, perforated sections; welded and seamless formed products of chrome and chrome nickel alloys. In attendance: Charles B. D. Wood, president; J. H. MacVeigh, vice-president and sales manager, and F. A. Schmidt, works manager.

Production Machine Co., Greenfield, Mass. Booth 73.
Counterless feed grinding and polishing machines. In attendance: A. H. Behnke, vice-president; T. A. Welch; P. A. Koerber, Chicago manager.

R

Reeves Pulley Co., Columbus, Ind. Booth 8-A.
The modern design of Reeves variable speed transmission, incorporating a number of recent improvements and refinements; in particular, new designs of electrical remote and electrical automatic controls for the Reeves variable speed transmission, showing the manner in which infinite variable speed regulation of any heat treating furnace of the continuous type, conveyor or machines may be adjusted infinitely in speed from one or more push button stations or, for certain installations, entirely automatically. In attendance: C. L. Irwin; A. E. Shibley, manager, Chicago branch office; C. M. Reeves, vice-president; F. T. Moore, H. M. Glessner and E. C. Schrade.

George P. Reintjes Co., Kansas City, Mo. Booth 32.
The non-metal furnace arch, built of interlocking tile so designed that the expansion pressures from temperature are compensated for; thereby reducing mechanical spalling and furnace shut-down to a minimum and with only two standard shapes a flat arch for furnace roofs and doors are formed; a truss arch is formed with a third shape; a furnace expansion tile is also shown. In attendance: George P. Reintjes, C. S. Whitman, J. L. Mayer, F. E. Oswald.

Republic Flow Meters Co., Chicago. Booth 14-B.
A complete line of Republic indicating, recording and controlling pyrometers; the new Republic control pyrometer, model No. 134; also model No. 135, a recent development in three-position control practice. In attendance: George S. Hendrickson, sales manager; George D. Conlee, chief engineer; Albert Spitzglass, experimental engineer; E. Schneider, S. C. Vail, W. L. Eckdahl and T. E. Bell.

Republic Steel Corporation, Youngstown. Booth 16-B.
Applications of Agathon alloy steels; Toncan copper molybdenum iron; Enduro stainless irons; Nitralloy; Upson bolts and nuts; Witherow die-rolled products. In attendance: J. M. Schlendorf, general manager of sales, alloy steel division; M. H. Schmid and G. F. Hess, assistant general manager of sales, alloy steel division; M. J. R. Morris, metallurgical engineer, Central Alloy district; and others.

Riehle Brothers Testing Machine Co., Philadelphia. Booth 1-F.



John A. Roebling's Sons Co., Trenton, N. J.
Booth 102.
Welding wire.

Roessler & Hasslacher Chemical Co., New York. Booth 11-B.

Complete line of chemicals used in the case hardening, heat treatment and heat coloring of steel; complete line of chemicals used in the electroplating of metals; demonstration of electroplating of copper, cadmium and zinc on steel; demonstration of a new method for the approximate determination of cyanide in case hardening baths; samples illustrating the application of electroplating and heat treatment of steel. In attendance: Walter M. Gager, metallurgist in charge; Charles H. Proctor, electroplating expert; D. A. Holt, chemist; A. C.

Stepan, sales manager, Chicago office; W. Nissen, and A. Papp, Chicago.

Rustless Iron Corporation of America, New York. Booth 21-D.

Ryan, Scully & Co., Philadelphia. Gas Section.
Photographs of recent installations; gas and combination gas and oil burners; sections of patented conveyor belt. In attendance: Frederick J. Ryan, president; Gordon A. Webb, Detroit representative; W. N. Goggin and H. L. Mills, Chicago representatives.

Joseph T. Ryerson & Son, Inc., Chicago. Booth 7-D.
Display panels of Allegheny metal, tool and alloy steels, cold-finished steels and other general steel products; movie showing method of handling orders through warehouse plants. In attendance: G. Van Dyke, manager special steels department; A. Y. Sawyer, manager cold-finished department; H. B. Ressler, general sales manager; William H. Bryant, Chicago sales manager; W. A. Marshall, C. S. Hegel and H. J. Walker, special steels division.

S

George Scherr Co., Inc., New York. Booth 14-L.
A complete line of optical precision measuring instruments and tools, featuring a new contour measuring projector; a new model of toolmakers microscope; a new measuring microscope; an optical dividing head; a new optical division checking device; an optical precision length measuring machine; a universal measuring and locating microscope. In attendance: George Scherr, Fritz Konig and R. P. Friis.

Selas Co., Philadelphia. Booth, Gas Section.
Selas air and gas mixing machines and compressors; Selas valves; industrial burners; blow torches; soldering irons. In attendance: F. Hess, manager.

Shakeproof Lock Washer Co., Chicago. Booth 10-L.
See: Illinois Tool Works.

Shell Petroleum Corporation, St. Louis. Booth 10-F.
A working display of Shell pickling acid and straight commercial sulphuric acid; also a display of samples of several S.A.E. grades of steel and other materials; these will contrast the results of pickling with commercial sulphuric acid with the noncorrosive, nonpitting effect of Shell pickling acid. In attendance: W. B. Stevenson, sales engineer, by-products division; E. G. Richardson and J. L. Manneville, assistant sales managers, by-products division; C. C. Crane, chief chemist for the Keystone Steel & Wire Co.; D. P. Summers, vice-president and general superintendent, Keystone Steel & Wire Co.; E. P. Kastien.

Shore Instrument & Mfg. Co., Jamaica, N. Y. Booth 14-D.
Improved Monotron; Model C-2 Scleroscope; Model "D" Scleroscope; Durometer and Elastometer (rubber testing instruments); Localcase and Localhard (for heat treating steel). In attendance: F. G. Kendall, sales manager, and B. C. Cleveland, Central Western representative.

Southern Manganese Steel, division of American Manganese Steel Co., St. Louis. Booth 28.
Fahralloy heat and corrosion resistant castings; the raw materials from which they are made, and other interesting features. In attendance: A. W. Daniels, vice-president; Russell J. Williams, sales manager; Edwin F. Mitchell, district sales engineer.

Southwark Foundry & Machine Co., Philadelphia. Booth 41-B.

Spencer Turbine Co., Hartford. Booth 75.
Spencer Turbo-compressors, used for supplying air in connection with oil and gas burning industrial furnaces, foundry cupolas, etc.; a 15 hp. machine will be operating to deliver air for any furnaces in operation during the show; also a 5 hp. machine with casing and end-heads made up of stainless steel (KA-2) and impellers of duralu-

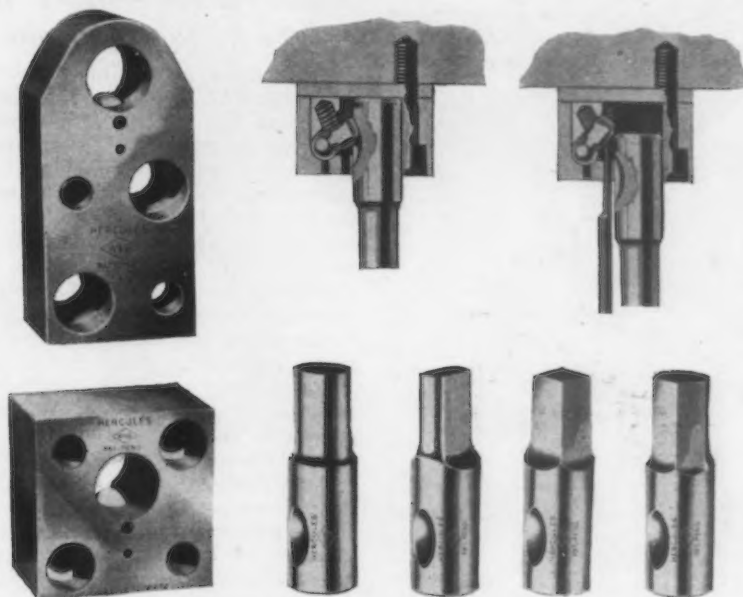
(Continued on page 758)

Interchangeable Punch System

INTERCHANGEABLE punches and retainers designed to eliminate the necessity of removing the die from the press in changing punches will be among the products shown by Whitman & Barnes, Inc., Detroit, at the

tenance costs, quicker set-ups and increased production due to reduced down-time for die repairs and the elimination of time lost due to broken punches.

From the illustrations it will be



The Punch Is Held in a Retainer By a Latch or Pawl Acting in a Recess in the Punch Shank. When the latch is pushed upward out of the recess (as shown in upper right-hand sectional view) the punch is released

National Metal Exposition in Chicago, the week of Sept. 22.

This punch system is applicable to practically all types of punching operations, but is for use particularly with piercing dies. The retainers mount on standard die sets and the punches are aligned by means of the usual die buttons. The set-up is relatively simple. Advantages claimed include lower die building and main-

tenance costs, quicker set-ups and increased production due to reduced down-time for die repairs and the elimination of time lost due to broken punches. From the illustrations it will be seen that this punch system comprises a removable punch which is held in a retainer by a detent (latch or pawl) that seats in a recess in the shank of the punch. By pushing the detent upward and out of the recess, which is accomplished by means of an extractor pin that works through the retainer punch block as shown, the punch may be instantly released. The mating surfaces of the detent and the

punch recess are of liberal proportions, and are said to show no wear after long runs; inasmuch as there is a minimum wedging action between the detent and the punch, the successive punching and stripping forces do not cause the punch to stick nor the retainer to split. The arrangement of the detent also serves to keep the punch properly in contact with the backing plate at all times.

As evidence that these punches will not bind nor stick in the retainer, and may be easily removed, the company cites a recent test of an 11/32-in. punch of this type. This tool had become scored, wedged in the metal being punched, and although it was broken in two on the stripping action, the punch shank remained in the retainer. The shank was then easily removed, no part of it showing wear.

Square and rectangular type retainers to take punches of sizes most commonly used are made. The square retainer is employed wherever space and center distances permit; closer center distances are obtained by combining the square with the rectangular types. The punches are also made in a full range of commonly used sizes, and with round, oblong, square and hexagonal piercing points. Both the retainers and the punches are standardized as to dimensions and are, therefore, interchangeable. They are precision made and all important surfaces are ground after heat treatment. Vanadium punch steel is used for the punches and a carburizing steel for the retainers.

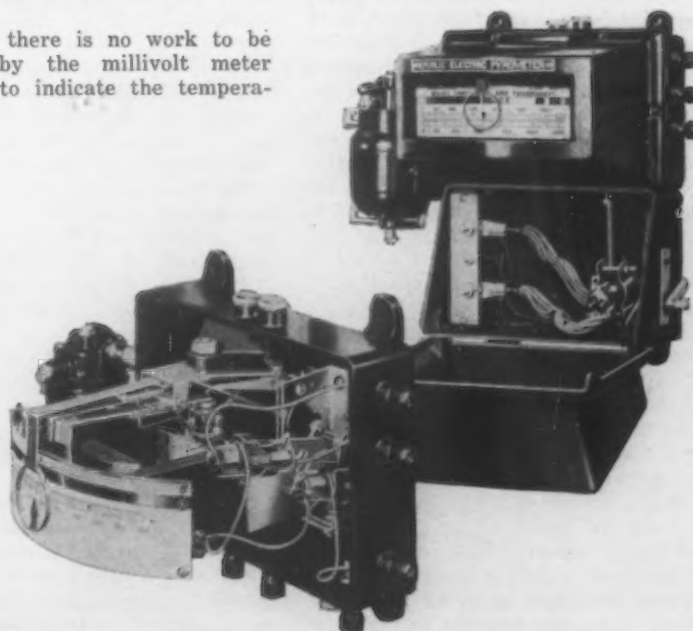
Stock punches are ground perfectly flat on the piercing end and exactly perpendicular to the axis of the punch. Special retainers or group plates can be furnished for center distance requirements that cannot be met by the standard square or rectangular retainers or by a combination of the two.

Control Pyrometers Recently Developed for Heat Treating

TWO new control pyrometers produced by the Republic Flow Meters Co., Chicago, will be exhibited at the National Metal Exposition in Chicago, the week of Sept. 22. They are known as models 134 and 135, and are shown herewith. No. 134 is equipped with a mercury switch which has a capacity of 50 amperes at 220 volts or 60 amperes at 110 volts. It will control directly, without the use of auxiliary relays of any kind, any load up to 10 kw. Sensitivity is accomplished through the elimination of insulating spacers or dead spaces. The millivolt meter is depended on solely to indicate the temperature.

The other model, No. 135, is designed for three positions, low, normal and high. This control is equipped with two 5-ampere mercury switches which eliminate metal-to-metal contacts within the pyrometer itself. As is the case with other Republic control

pyrometers, there is no work to be performed by the millivolt meter other than to indicate the temperature.

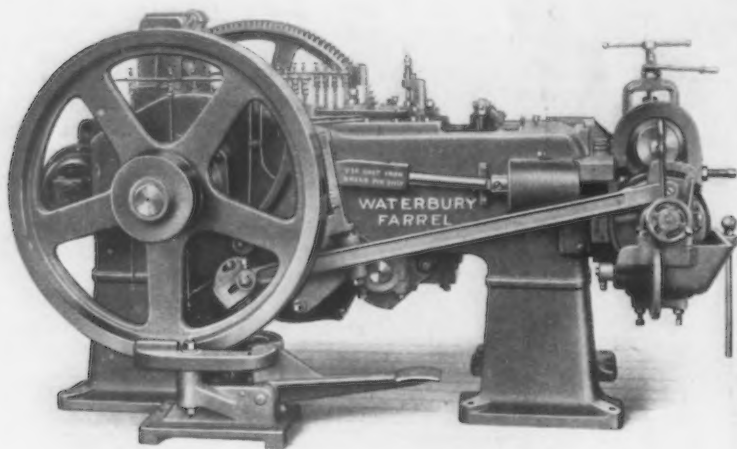


Triple-Stroke Headers Operate at High Speed

A NEW line of crank-actuated solid-die triple-stroke automatic cold headers has been announced by the Waterbury Farrel Foundry & Machine Co. of Waterbury, Conn. Although the average cold-headed bolt requires but one or two blows to upset, it is frequently necessary because of the abnormal shape or unusual size of a head to employ a

header should it become stalled on centers.

The cut-off mechanism consists of a bar operating through the frame at right angles to the wire, to which a knife is attached. This knife is notched to suit the diameter of the wire and the wire blank remains in this notch while being carried from the feed line to the heading line, be-



THE Roll Feed and Knockout Drives Are Shown in the View Above. The cut-off side of this $\frac{3}{8}$ -in. solid-die triple-stroke crank header, with gear guards removed, is shown at the right

triple-blow header. The machines illustrated have been developed to meet this condition and are designed to operate at high speeds. They are built in four standard sizes with heading capacities from 65 to 200 tons and wire capacities from $\frac{5}{16}$ to $\frac{5}{8}$ -in. diameter. In general design, these headers are similar to the company's single and double stroke machines.

The wire is fed from a reel by a patented friction roll feed, which is adjustable for stroke, through a quill in the frame and against an adjustable stop, where it is cut off to the desired length and transferred over to the centerline of the heading die and punches. The heading die is located in a steel block in the frame and the three punches in a holder attached to a vertically-operated slide. The vertical slide is dovetailed and gibbed in the end of the crank-actuated gate, which delivers the heading blows.

Provision is made for shifting the slide up and down to bring each punch successively into line with the die where it is momentarily locked while each blow is being struck. Adjustments are provided for alining the punches accurately with the die as well as for regulating the distance between the punches and dies to suit the length of wire blank. The latter adjustment consists of a wedge incorporated in the gate, by means of which it is also possible to free the

ing held in place by a finger. The stroke of the cut-off is adjustably timed relative to the stroke of the heading gate, as required for work of different lengths. The cut-off drive mechanism is designed with a safety device which renders it inoperative in the event of the knife being obstructed in its movement, thus preventing breakage of its working parts.

After heading, the work is ejected from the die by a knock-out device which acts also as a stop for the wire blank, taking the thrust of the first punch. This device is cam-actuated and its stroke is set with the aid of a graduated scale on the cam roll arm to which the connection is attached where desired. The connection is made with a safety device which disconnects the knock-out actuating mechanism, in case a blank becomes

jammed in the die, thus preventing breakage.

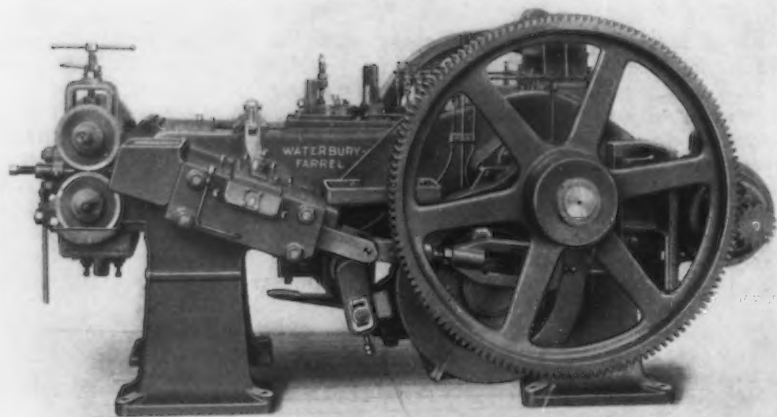
These machines are furnished arranged for either countershaft or motor drive, and with or without tools.

Better Merchandizing Held To Be Key to Profits

Five thousand business men in New England have just received the sixth and last bulletin of a series issued by the Industrial Committee of the New England Council analyzing the present business situation and the methods found most effective in dealing with it. The committee feels that under present conditions better merchandizing on the part of producers is the key to net profits without which business and employment cannot long be maintained.

Commenting on the committee's educational campaign, J. W. Hook, president, Geometric Tool Co., New Haven, Conn., a member, declares:

"One thing we have to learn from the present period of readjustment in business is that profits are in no small measure the sum total of savings effected at any possible point. Present conditions are a challenge to each business to increase the efficiency of



its operations. Margins are narrow, the buyer is king, and there are no 'easy profits' such as sometimes are possible in boom times.

"Inflexible production systems, meaning those in the hands of inflexible management, impose handicaps that absorb profits which in other hands would have been saved. Failure to apply the latest findings of research and to utilize current known best methods of manufacturing in the reduction of costs are responsible for the apparent inability of some to make profits in the present situation.

"Although in various lines, volume is smaller this year than last, the firms that are working hard to stop, at their source, all those unnecessary deductions from gross profits are the firms for whom the depression is already over."



Fig. 1, Below, Shows the Riveter With Dies Arranged Horizontally. Fig. 2, at left, and Fig. 3, at right, show the machine with dies vertical

Differential Case and Crown Gear Riveters

TO meet the requirements of manufacturers of differential cases and crown gear assemblies, the Hanna Engineering Works, 1765 Elston Avenue, Chicago, has brought out the riveters here illustrated. Because of the heavy pressure applied to form the rivet heads, these machines are arranged for driving two diametrically opposite rivets at the same time, thus assuring symmetrical clamping of the parts.

Fig. 1 shows the machine with the dies horizontal. The work is supported on a stud which is carried by

an arm having adjustable stops by which the work is positioned correctly with respect to the dies when the arm is swung over to this limiting point. This arm furnishes a convenient means for assembling the component parts and for supporting them while the rivets are being struck.

A form of the machine with dies vertical, the work being carried upon a central pivot midway between the two dies, is shown in Fig. 2. The subpress construction incorporated assures proper alinement of the dies despite the deflection in the riveter

frame that is inevitable with the heavy pressures employed in compression riveting. The machine shown in Fig. 3 is adapted for a wider range of work by the provision of adjustments that enable the dies to be shifted over a considerable range to suit various distance requirements between the rivets.

Uniformity of riveting pressure, regardless of variations in the thickness of the parts being joined, is emphasized as producing uniform results and eliminating damage to the parts in process.

New Feed Mechanism for Bradford Lathes

AN apron feed mechanism designated as the Kant Slip has been brought out by the Bradford Machine Tool Co., Cincinnati, for its 14 to 48-in. standard lathes.

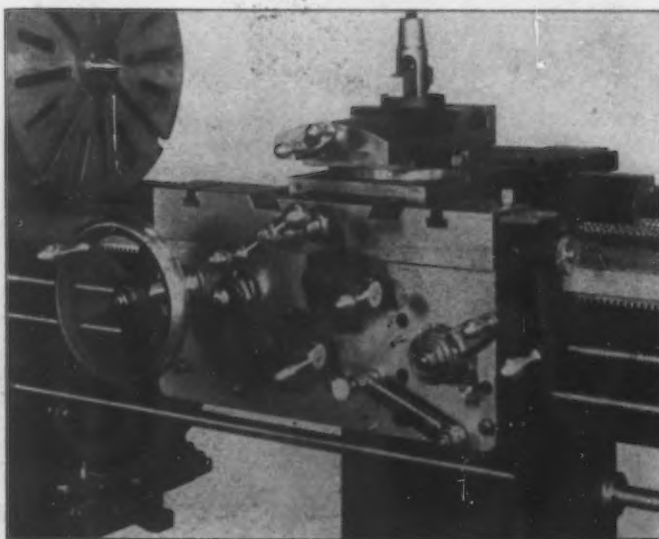
Claims for this device include powerful and positive disengaging, as well as engaging, movement; smooth feed engagement and disengagement accomplished by a partial stroke of a small lever; simplicity and compactness, but with stems and bearings of generous size, made possible by departure from the usual tandem arrangement; and absence of frequent adjustment, the mechanism being said to take up wear automatically.

It is claimed that heavy cuts may be taken with ease and with safety. No pressure is needed to keep the feeding mechanism engaged. This is because the slight friction engaging angles cause these parts to remain fast and in permanent contact when they are engaged. The small eccentricity of the eccentric engaging shaft also effects the automatic lock-

ing of these parts. Conversely a powerful eccentric operated disengaging movement for the feeding

mechanism is always available. The arrangement of controls may be seen in the close-up view of the apron.

SMOOTH
Feed En-
gagement and
Disengagement
Are Accom-
plished by Par-
tial Stroke of
a Small Lever





Special Machine Welds 36-In. Steel Pipe

THIS illustration shows an electric tornado machine for carbon arc welding which is to be exhibited by the Lincoln Electric Co., Cleveland, at the National Metal Exposition at Chicago, the week of Sept. 22. It is arranged to operate on a pipe 36 in. in diameter with $\frac{1}{2}$ in. wall. The demonstration is regarded as typical not only in the manufacture of pipe, but for lap, butt, or edge welds. Such ap-

plications include tanks, wheels, hubs, brake cross shafts, axle housings, rectangular and circular tanks, steel barrels, various types of ship construction, etc.

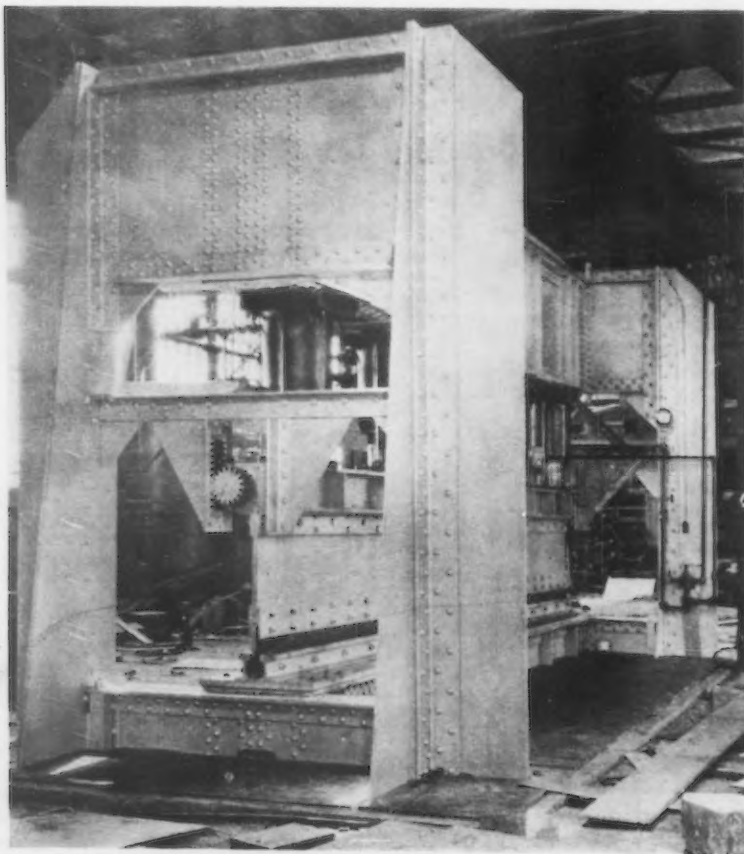
The weld which is obtainable from this type of equipment is described as being very ductile, with an elongation of 20 to 25 per cent in 2 in. and with a tensile strength of 60,000 to 80,000 lb. per sq. in.

Hydraulic Brake Press Bends $\frac{5}{8}$ -In. and Heavier Plate

THE Duff Patents Co., Pittsburgh, has designed and installed in its own shop the heavy hydraulic brake press here pictured, which has capacity for bending $\frac{5}{8}$ -in. plate, 25 ft. long, cold, to any angle, in one stroke,

as well as plate of heavier gage in shorter lengths.

The machine is equipped with five 200-ton hydraulic cylinders, making available a total pressure capacity of 1000 tons. These cylinders are mounted



between heavy steel girders, as shown. The end housings are made from 1-in. solid steel plate and each housing has an opening through which the formed material may be withdrawn. The weight of the machine is approximately 160,000 lb.

Each cylinder is arranged so that it can be operated independently, which adapts the brake for the forming of parts that require several operations, one operator passing the work to the next after his particular part of the operation has been completed. The principal use of the machine, however, is for bending long plates of heavy gage; on such work the time required for bending is said to be less than 1 min., with the finished plate true in form. Ordinarily two men are required to operate this press, although for some work only one operator is necessary.

The male die is usually of knife-edge type, forming a square corner, but dies of any shape or radius can be used. The machine is equipped with automatic stops so that when the stroke is completed it is shut off automatically.

Floor space of 14 x 30 ft. is occupied by the machine. The height of the brake is 17 ft. 4 in.; of this, 2 ft. 6 in. is in a pit below the floor, making the net headroom 14 ft. 10 in.

Pillow Block Designed for Low Power Loss

AN anti-friction ball and socket pillow block, fitted with Timken roller bearings, is being put out by Link-Belt Co., 910 South Michigan Avenue, Chicago. Designed several years ago, it has been improved and perfected in the meantime, and has been actually service-proved (or tested) in practically every type of service.

These pillow blocks are designed to fit any good grade of commercial shafting, from 1 $\frac{7}{16}$ in. diameter to the largest size, without special fittings or the use of appliances.

Because these pillow blocks use pressure lubrication, they are practically dust tight. The grease is forced in at the center and out at the shaft openings. Thus, with the addition of the grease seal at the top, dust and grit are kept out of the bearing. The grease stays inside the bearing, where it belongs.

Total value of graphite crucibles, retorts and stopper heads shipped or delivered by manufacturers in the United States in 1929 amounted to \$2,500,813, an increase of 7.1 per cent, compared with \$2,336,066 reported for 1927, according to the Bureau of the Census. The total for 1929 was made up as follows: Graphite crucibles, retorts and stopper heads, \$2,500,813; other products, \$319,753.

Redesigns 10-Ft. Boring Mill

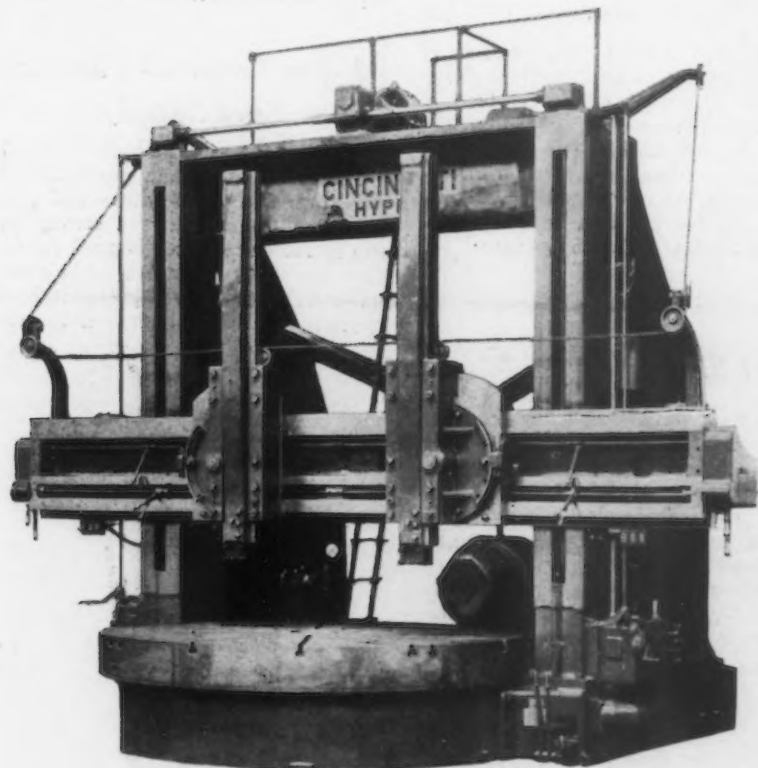
SIMPLIFIED control is among the improved features of the redesigned 10-ft. boring mill recently announced by the Cincinnati Planer Co., Cincinnati.

The table is driven by means of an internal spur gear and hardened spiral bevel gearing that is mounted in ball bearings to assure smooth action of both the gears and the table. The table track and the spindle are lubricated by means of a pump, which also circulates oil to the speed box and other units. The speed box, with motor, is mounted rigidly between two extensions, as shown. The driving motor is of variable-speed type and transmits power to the speed box

machine and controlled by push button. These motors are interlocked so that it is impossible to raise or lower the rail when it is clamped.

With the method of control employed it is possible for the operator to change table speeds, actuate

ARRANGEMENT of the Rapid Traverse Motor May Be Seen in the Right-hand End View of the Rail, at the Right. Location of the speed box and table drive motor is shown in rear view, at lower right



through herringbone gears. A constant-speed motor can also be used, in which case a nine-speed box is furnished in place of the four-speed box of the variable-speed motor drive. A tank underneath the spindle gages the oil from the speed-box and the table track; from this tank the oil is recirculated to the different units, provision being made to assure clean oil to all parts. A gage mounted in a conspicuous place permits the operator to see at a glance whether or not the oiling system is functioning properly.

Movement of the heads is controlled by push buttons. Small motors mounted on each end of the rail are interlocked with the feed, and by shifting a lever, either the feed or the rapid traverse is supplied. This eliminates all mechanism from the top of the machine. Heads are independent of each other and are controlled by separate feed box and independent rapid-traverse motors. The rail is raised and lowered by another motor which is placed on top of the

the rapid traverse to the heads, raise and lower and clamp the rail from his working position. Among other advantages this control reduces set-up time. Similar improvements have been made in other sizes of these machines. Side heads can be supplied if desired.

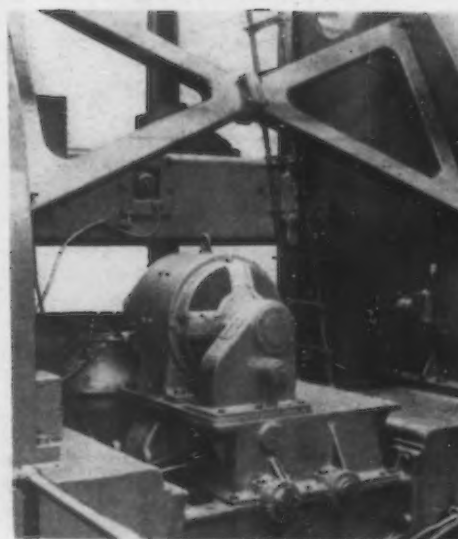
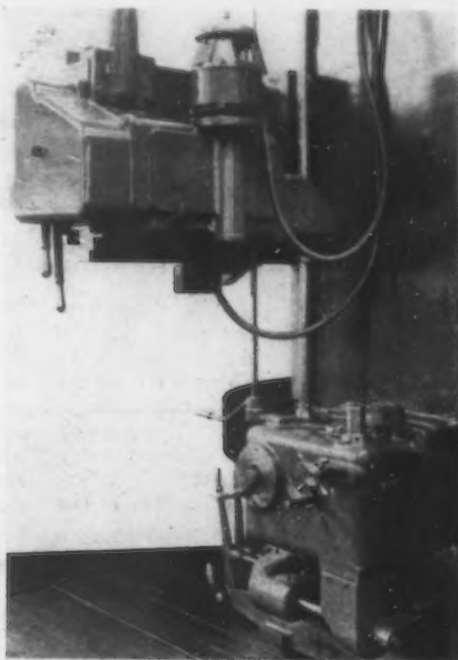
Testing Society Revises Some Specifications

The American Society for Testing Materials has adopted a number of revisions in the standard specifications for various steel products. Among these are the specifications for commercial quality hot-rolled bar steels and cold-finished bar steels and shaftings applicable to the screw steel grades increasing the sulphur content to provide better machinability.

The specifications for structural steel for forge welding have been re-

vised, allowing higher silicon content by agreement between purchaser and manufacturer.

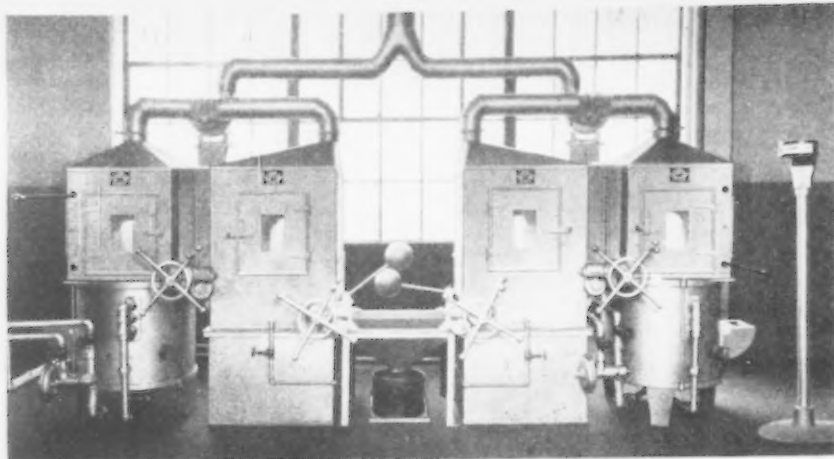
The selection of test specimens in specifications for lapwelded and seamless steel and lapwelded iron boiler tubes, and the tolerances for this material have been modified; and specifications for alloy steel bolting mate-



rial for high temperature service have been limited to cover bolting stock up to and including 2½-in. diameter.

A number of tentative standards and tentative revisions to standards have been adopted as standard, there having been no criticism during the past year on the tentative specifications.

American Engineering Co., Philadelphia, has appointed the following new distributing agents for Lo-Hed electric hoists: Starr-Carpenter, Park Building, Pittsburgh, and Weed & Co., 95 Swan Street, Buffalo.



Special Furnace Removes Case-Hardening Hazards

A FURNACE which is claimed to eliminate the toil and hazards of case hardening will be exhibited by the Hyro Mfg. Co., New York, at the National Metal Exposition in Chicago, the week of Sept. 22. A battery of two of these furnaces is illustrated.

The company claims that an entirely different principle of operation has

been employed in the construction of this furnace to do away with the danger and laborious effort involved in charging, lifting and unloading the work, to say nothing of completely eliminating fumes and other unfavorable conditions incident to case hardening. A feature is a unique carrying mechanism, easy to operate.

Small Bar and Billet Shears

A NEW small bar and billet shear designated as the FV-35 will be demonstrated by Henry Pels & Co., 90 West Street, New York, at the National Metal Exposition, Chicago, Sept. 22 to 29.

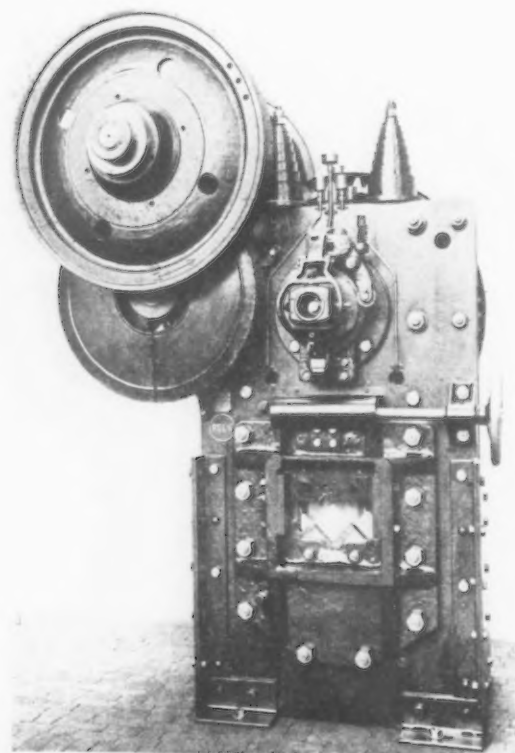
This machine will shear cold, with interchangeable knives, steel of 65,000 lb. per sq. in. tensile strength. The capacity is for 4-in. rounds, 3½-in. squares and 1½ x 13-in. or

1¼ x 8-in. flats. Specifications include: Strokes per min., 22; stroke length, 3½ in.; horsepower, belt drive, 12; speed of flywheel, 375 r.p.m. The machine is 63 in. wide, 71 in. long and 102 in. high; it weighs approximately 12,100 lb. net.

A larger bar shear, designated as the FV-42, has also been added to the company's FV line, the capacity range of which is up to 9¼ in. rounds, cold.

The FV-42 is for rounds up to 4¼ in., squares up to 4 in., and flats 1½ x 14 in. or 1½ x 9 in. It is 79 in. wide, 87 in. long and 116 in. high; its weight, net, is 15,400 lb.

The frame of both new machines is of the steel plate construction that features other machines built by the company. A cast steel frame around the shear throat provides additional strength. The lower knife rests on a cast steel bridge which is supported on both frame plates, the pressure of the lower knife being transmitted equally to both plates. This bridge is emphasized as adding markedly to the strength and rigidity of the frame. To conserve floor space, gearing and flywheels are placed overhead. Twin flywheels make for balance and smooth operation. The flywheel shaft runs in a long bearing

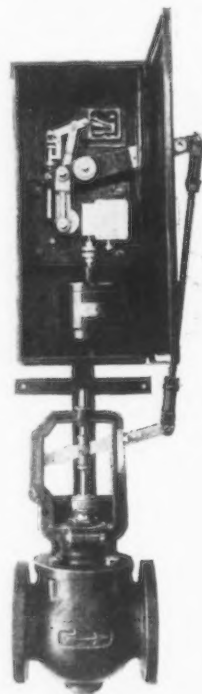


with automatic ring oilers; all gears have cut teeth, and bronze bushings are used throughout.

The machine is operated through a clutch of the three-jaw type. Operation is by hand-lever, but foot trip can be provided if desired. The clutch can be set to disengage automatically after each stroke, or can be locked for continuous operation. Backlash is prevented by a special pin which locks the clutch with the shaft while the machine is under cut; this feature is emphasized as eliminating a frequent source of trouble, especially in cutting very hard steel. A band brake is mounted on the end of the eccentric shaft and stops it automatically in the highest position of the slide, this band brake further assuring trouble-free clutch operation.

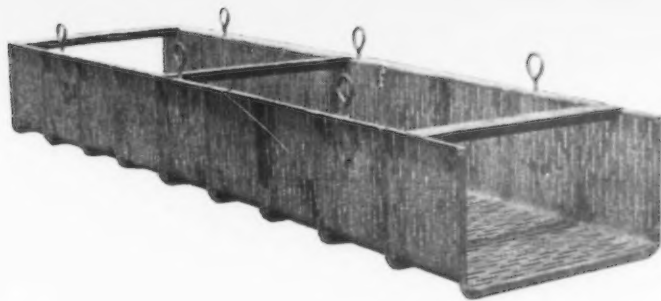
Valve Controls Furnace Fuel Supply

LARGE valves for the close regulation of liquids and gases under a wide range of temperature and pressure conditions require a strong and sturdy motor-operated control mechanism to operate them in a satisfactory manner. The motor-operated three-position controller here illustrated



will develop 200 lb. pull on the valve lever. It will be displayed by the Automatic Temperature Control Co., Inc., Philadelphia, at the National Metal Exposition, the week of Sept. 22.

The unit shown is mounted with a typical balanced V-port regulating valve for steam, water, oil, etc. The motor used is series wound universal type for a.c. or d.c. and can be furnished for either 110 or 220 volts. The motor runs only when electrical contact is made, operating the lever arm through a crank a definite adjustable distance. The complete maximum stroke of 5 in. in length is made in 5 sec.



Rustless Steel Container for Heat Treaters

H EAT resisting containers of rustless steel, a type of rustless steel, are formed and then welded by a special process developed by the Pressed Steel Co., Wilkes-Barre, Pa. They will be one of the exhibits of that company at the National Metal Exposition, Chicago, the week of Sept. 22. One of these containers is here illustrated.

It is a perforated basket 13 ft. long, 48 in. wide and 18 in. deep and is made up in nine sections. The material for heat treating is packed in the basket, which passes through the annealing furnace, after which it is quenched in water and then dipped in a 10 per cent solution of sulphuric acid.

Equipment for Testing Compression Springs

A FEATURE recently added to the type D pendulum Elasticometer spring testing machine marketed by the Coats Machine Tool Co., 110 West Fortieth Street, New York, is a micrometer dial gage and spring loading fixture to facilitate testing of hard closely - wound compression springs. The machine itself was described in *THE IRON AGE* of Jan. 10, 1929.

When such springs, designed to carry a load, say, of 1 lb. for each 0.001 in. compression, are to be tested, the length scale graduated in 1/16 in. is inadequate for very accurate readings. For such tests the dial micrometer and holder is attached to the upper compression plate and the loading fixture is placed in a re-

cess of the lower compression plate.

The illustration shows the attachment in working position. The dial micrometer is graduated in 0.001 in. and has a spindle travel of 1.000 in. The lower loading fixture has a dovetail slide; mounted on this slide is a boss with a small projection, the combined length of which is equal to the compressed length of the spring to be tested. Inasmuch as different bosses are required for each closed spring length, the boss is made detachable. The slide itself, which may be pulled out of the fixture by means of the handle, is centered by a ball spring stop.

Testing is as follows: The position of the dial gage hand is determined when the gage spindle is brought flush with the level of plate through which it projects.

In the gage illustrated at the left this reading is 0.953 in. The spring is then slipped over the boss, the handwheel is turned to raise the lower compression plate until the dial reading is again 0.953 in.

Beyond this point the projection on the boss would enter the hole in the gage holder, but in this precise position the compressed length of the spring must equal within a fraction of 0.001 in. the length of the 1 23/32-in. boss. The pendulum of the machine indicates automatically the load.

A dial with 1-in. spindle range has been chosen in case it is important to control closely the open length of the spring.



Lapping Machine for Tungsten-Carbide Tools

F OR the rapid lapping of tungsten-carbide tools the Modern Diamond Tool Co., 1050 Mount Elliott Avenue, Detroit, has brought out a new machine, designated as the model H-3.

This machine, which weighs about 350 lb., is of rigid construction. It is equipped with an iron lapping wheel charged with diamond dust. The drive



is by a 1/2-hp. motor mounted in the base, the speed of the wheel being half that of the motor. The spindle is mounted in large adjustable thrust ball bearings. The machine is equipped with an adjustable horizontal slide, a vertical slide and a platen or workholder by means of which the tool to be lapped may be moved across the face or the periphery of the wheel. This platen has angular adjustment and there is an angular gage that facilitates lapping the cutting edge of the tool to any angle.

In the lapping operation it is necessary to keep the lapping wheel slightly moist with a mixture of olive oil and diamond powder.

The General Electric Co. announces a convenient reversing equipment for small motors. The switch is designed to handle squirrel-cage motors rated 1-1/2 hp. at 110 volts, and 2 hp. at 220, 440, 550 and 600 volts, 25 to 60 cycles. The equipment is mounted on a compound base for mounting in an enclosing case. The case is suitable for wall mounting.

Reliance Electric & Engineering Co., manufacturer of motors, has moved its Boston office from 80 Federal Street to 89 Broad Street. R. H. Smith is district manager.

August Iron Output 4.3 Per Cent Below July—Net Loss of Five Furnaces

ACTUAL returns from every blast furnace active during August show that the preliminary estimates, published in THE IRON AGE, Sept. 4, were practically correct. The actual data vary only 83 tons per day from the estimate.

Production of coke pig iron in August was 2,523,921 gross tons or 81,417 tons per day for the 31 days. Estimates last week made the daily rate 81,500 tons, so that the actual is 83 tons less than the estimate. The August output contrasts with 2,639,537 tons or 85,146 tons per day for the 31 days in July. The decline in

the daily rate for August was therefore 3729 tons or 4.3 per cent. The decline in July from June was 13 per cent. The August daily rate is the smallest since October, 1924, when it was 79,907 tons. It is the smallest for any August since 1924, when it was 60,875 tons.

Comparisons for 8 Months

Production for the first eight months of this year was 23,424,770 tons as compared with 29,181,760 tons to Sept. 1, 1929, and with 24,729,315 tons for the same period in 1928. The 1930 total for eight months

is the eleventh largest on record.

Eight furnaces were blown out during August and three were blown in—a net loss of five. In our estimates last week the net loss was six. In July the net loss was 16 furnaces. The August record may indicate a check in the rapid shutting down of furnaces as represented by 41 in the four months previous to August. In the last five months the net loss has been 46 furnaces.

Operating Rate on Sept. 1

For the 139 furnaces blowing on Sept. 1, the operating rate is esti-

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1926—Gross Tons

	1926	1927	1928	1929	1930
Jan.	106,974	100,123	92,573	111,044	91,209
Feb.	104,408	105,024	109,904	114,507	101,390
Mar.	111,032	112,366	103,215	119,822	104,715
Apr.	115,004	114,074	106,183	122,087	106,062
May	112,304	109,385	105,931	125,745	104,283
June	107,844	102,988	102,733	123,908	97,804
1/2 year....	109,660	107,351	101,763	119,564	100,891
July	103,978	95,199	99,091	122,100	85,146
Aug.	103,241	95,073	101,189	121,151	81,417
Sept.	104,543	92,498	102,077	116,585	.....
Oct.	107,553	89,819	108,832	115,745	.....
Nov.	107,890	88,279	110,084	106,047	.....
Dec.	99,712	86,960	108,705	91,513	.....
Year	107,043	99,266	103,382	115,851	.....

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York and Mass.	157,034	162,328	215,442	215,704
Lehigh Valley	70,491	67,348	69,996	76,639
Schuylkill Valley	29,501	44,312	37,911	46,752
Lower Susq. and Leba- non Valley	18,579	19,426	22,593	42,915
Pittsburgh district	581,528	605,414	647,557	677,743
Shenango Valley	68,735	70,917	67,861	72,570
Western Pennsylvania ..	65,850	61,886	75,140	106,875
Maryland, Va. and Ky. ..	98,214	93,697	97,980	112,233
Wheeling district	145,330	142,492	149,070	168,365
Mahoning Valley	224,891	246,176	255,071	280,193
Central and North'n Ohio	227,826	258,435	276,722	284,849
Southern Ohio	43,851	47,076	48,279	48,264
Illinois and Indiana	486,334	507,822	620,941	719,328
Mich., Minn., Mo., Wis., Colo. and Utah	114,057	119,769	125,598	144,381
Alabama	191,700	192,002	222,330	234,289
Tennessee ....	.....	437	1,728	1,600
Total	2,523,921	2,639,537	2,934,129	3,232,760

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
August, 1929	98,900	22,251	121,151
September	95,426	21,159	116,585
October	93,614	22,101	115,715
November	83,276	22,771	106,047
December	68,152	23,361	91,513
January, 1930	71,447	19,762	91,209
February	81,580	19,810	101,390
March	83,900	20,815	104,715
April	85,489	20,573	106,062
May	84,310	19,973	104,283
June	77,883	19,921	97,804
July	66,949	18,197	85,146
August	64,857	16,560	81,417

*Includes pig iron made for the market by steel companies.

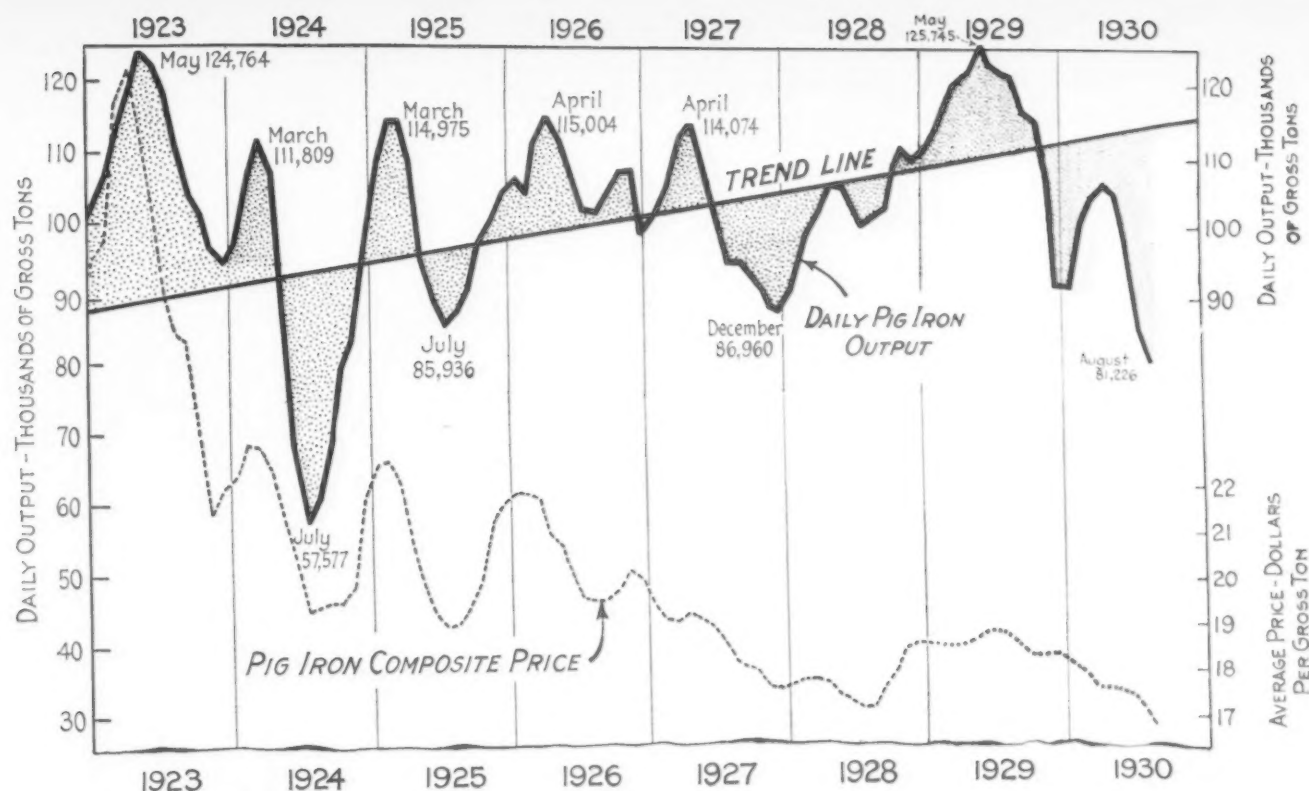
Coke Furnaces in Blast

	Sept. 1		Aug. 1	
Furnaces	Number in Blast	Rate of operation	Number in Blast	Rate of operation
New York:				
Buffalo	8	4,450	8	4,800
Other N. Y. and Mass. ..	2	615	2	565
New Jersey	0	.....	0	.....
Pennsylvania:				
Lehigh Valley	5	2,265	5	2,170
Schuylkill Valley	2	950	2	1,020
Susquehanna Valley ..	1	600	1	550
Ferromanganese	0	.....	0	.....
Lebanon Valley	0	.....	0	.....
Ferromanganese	0	.....	0	.....
Pittsburgh District	27	18,215	28	18,470
Ferro. and Spiegel ..	3	465	3	620
Shenango Valley	4	2,215	4	2,285
Western Pennsylvania ..	4	2,410	3	1,810
Ferromanganese	1	95	2	185
Maryland	4	2,540	4	2,450
Wheeling District	7	4,690	7	4,755
Ohio:				
Mahoning Valley	11	7,255	11	7,170
Central and Northern ..	11	6,670	14	8,335
Southern	4	1,415	4	1,520
Illinois and Indiana	21	15,400	22	16,100
Mich., Wis. and Minn. ..	6	2,845	6	2,700
Colo., Mo. and Utah	2	815	2	775
Ferromanganese	1	85	0	.....
The South:				
Virginia	1	255	1	210
Kentucky	1	370	1	355
Alabama	13	6,000	14	6,800
Ferromanganese	0	.....	0	.....
Tennessee	0	.....	0	.....
Total	139	80,620	144	83,645

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1928—Gross Tons

	1928	1929	1930
Jan.	2,869,761	3,444,370	2,827,461
Feb.	2,900,126	3,206,185	2,838,920
Mar.	3,199,674	3,714,473	3,246,171
Apr.	3,185,504	3,662,625	3,181,868
May	3,283,856	3,898,082	3,232,760
June	3,082,000	3,717,225	2,934,129
1/2 year	18,520,921	21,640,960	18,261,312
July	3,071,824	3,785,120	2,639,537
Aug.	3,136,570	3,755,680	2,523,921
8 months	24,729,315	29,181,760	23,424,770
Sept.	3,062,314	3,497,564	.....
Oct.	3,373,806	3,588,115	.....
Nov.	3,302,523	3,181,411	.....
Dec.	3,369,846	2,836,916	.....
Year*	37,837,804	42,285,769	.....

*These totals do not include charcoal pig iron. The 1929 production of this iron was 138,193 gross tons.



Daily production of pig iron is now proportionally about as much below needs as in August, 1924

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 1,275,000 tons

mated at 80,620 tons per day. This contrasts with 83,645 tons per day for the 144 furnaces blowing on Aug. 1.

Of the eight furnaces shut down during August, four were independent steel company stacks. Two belong to the Steel Corporation and two were merchant furnaces. One each of the three furnaces blown in is credited to the Steel Corporation, the independent steel companies and the merchant group.

Furnace Changes During August

During August only three furnaces were blown in: No. 2 furnace of the

New Jersey Zinc Co. in the Lehigh Valley; No. 2 Donora furnace of the American Steel & Wire Co. in the Pittsburgh district and one furnace of the Colorado Fuel & Iron Co. in Colorado.

Among the furnaces blown out or banked during August were No. 1 furnace of the New Jersey Zinc Co. in the Lehigh Valley; one Eliza furnace of the Jones & Laughlin Steel Corporation, and the Neville Island furnace of the Davison Coke & Iron Co. in the Pittsburgh district; one furnace of the Otis Steel Co., No. 4 furnace of the National Tube Co., and the United furnace of the Republic Steel Corpo-

ration in northern Ohio; one furnace of the Wisconsin Steel Co. in Illinois, and one Fairfield furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

To Install Open-Hearth Furnace at St. Louis

The St. Louis Screw & Bolt Co., St. Louis, will install an open-hearth furnace of 40-ton capacity. The equipment will cost \$250,000 and will result in the employment of 25 additional workers. It will be completed by Jan. 1.

Keystone Steel & Wire Co. reports net income, subject to audit, for the year ended June 30, of \$585,909, equal to \$2.20 a share on the common stock after deduction for preferred dividends. These earnings represent a sharp reduction from net income reported for the year ended June 30, 1929, which was equivalent to \$5.52 a common share.

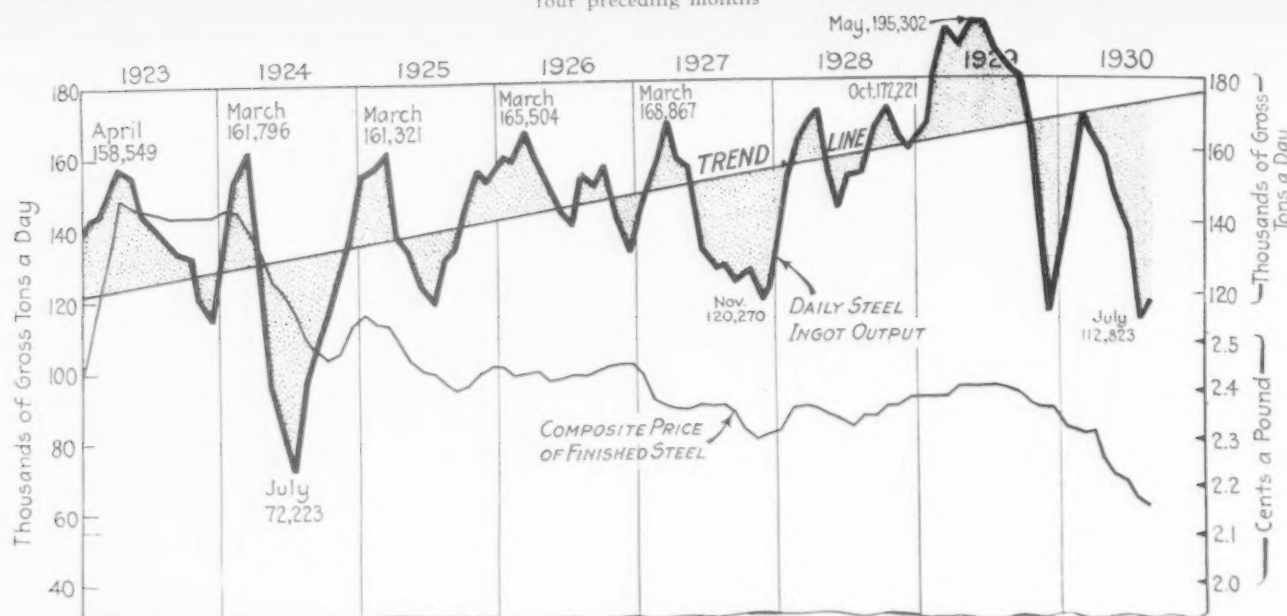
Carnegie Steel Co. has contracted with the Koppers Rheolaveur Co., Pittsburgh, for the design and installation of a large coal-washing plant at the Clairton by-product coke works. The plant will have a washing capacity of 12,000 tons a day of 20 hr., and will cost approximately \$2,000,000.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1928	1929	1930	1928	1929	1930
Jan.	2,155,133	2,651,416	2,214,875	22,298	28,208	27,260
Feb.	2,274,880	2,498,901	2,284,234	19,320	25,978	21,310
Mar.	2,588,158	2,959,295	2,600,980	27,912	24,978	23,345
Apr.	2,555,500	2,826,028	2,564,681	18,405	22,413	27,777
May	2,652,872	3,105,404	2,613,628	29,940	25,896	30,296
June	2,448,905	2,999,798	2,304,223	32,088	33,363	27,327
½ year.....	14,675,448	17,040,842	14,582,621	149,963	160,836	157,325
July	2,464,896	3,039,370	2,075,414	32,909	31,040	17,728
Aug.	2,561,904	3,065,874	2,010,572	24,583	28,461	20,909
8 months....	19,702,248	23,146,086	18,668,607	207,455	220,337	195,962
Sept.	2,477,695	2,862,799	.....	22,278	27,505	.....
Oct.	2,729,589	2,902,960	.....	23,939	31,108	.....
Nov.	2,654,211	2,498,291	.....	29,773	31,866	.....
Dec.	2,647,563	2,112,704	.....	28,618	28,564	.....
Year	30,211,606	33,522,840	.....	312,063	339,380	.....

*Includes output of merchant furnaces.

Ingot Output in August Turned Upward for the First Time Since February. Prices in August continued the sharp drop of the four preceding months



Ingot Production Turns Upward with Gain of 5½ Per Cent

PRODUCTION of open-hearth and Bessemer steel ingots in the United States in August is calculated by the American Iron and Steel Institute at 3,095,293 gross tons, an increase of 5.5 per cent on July and the first forward movement since

last February, which was at a level of about 1,000,000 tons higher. August production was higher than that for last December, which was at the bottom of the first portion of the decline but, except for that month and for July, 1930, it represented the

lowest daily average tonnage since July, 1925. It was, however, only 1 per cent below the figure for November, 1927.

On the daily basis, with 26 working days, August shows 119,050 tons. This is about 35 per cent lower than the average for August, 1929, which was the highest August ever reached.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

	Reported by Companies Which Made 94.27 Per Cent of the 1929 Ingots		Calculated Output of All Companies		No. of Working Days
	Open- Hearth	Bessemer	Monthly	Daily	
Total, 1928.....	40,538,657	6,591,217	49,865,185	160,338	311
1929.....					
January.....	3,692,062	549,616	4,500,131	166,672	27
February.....	3,590,826	489,279	4,328,713	180,363	24
March.....	4,180,408	596,691	5,068,176	194,930	26
April.....	4,025,409	610,351	4,950,053	190,387	26
May.....	4,275,161	707,484	5,286,246	195,787	27
June.....	3,999,363	622,004	4,902,955	196,118	25
6 months.....	23,763,229	3,605,425	29,036,274	187,331	155
July.....	3,922,052	649,950	4,850,583	186,561	26
August.....	3,987,100	668,023	4,839,086	182,929	27
8 months.....	31,672,682	4,923,398	38,825,943	186,663	208
September.....	3,624,954	642,886	4,527,887	181,115	25
October.....	3,631,674	612,235	4,534,326	167,939	27
November.....	2,796,214	522,672	3,521,111	135,427	26
December.....	2,375,797	360,489	2,903,012	116,120	25
Total, 1929.....	44,101,321	7,091,680	54,312,279	174,639	311
1930.....					
January.....	3,137,002	441,572	3,796,090	140,596	27
February.....	3,336,021	508,618	4,078,327	169,930	24
March.....	3,513,904	529,616	4,299,905	165,381	26
April.....	3,406,610	509,234	4,153,860	159,764	26
May.....	3,265,190	528,968	4,024,778	149,066	27
June.....	2,835,527	407,586	3,440,239	137,610	25
6 months.....	19,494,254	2,935,594	23,793,199	153,505	155
July.....	2,411,592	353,723	2,933,399	112,823	26
August.....	2,543,466	374,467	3,095,293	119,050	26
8 months.....	24,449,312	3,663,784	29,821,891	144,067	207

Sixth Largest 8-Month Total

FOR the first eight months of 1930 production was 29,821,891 gross tons. The average daily rate for the period was 144,067 tons, which is 22.8 per cent lower than the similar average for the first eight months of 1929—the highest figure ever reached.

Except for 1929, the first eight months of this year compare favorably with a number of the high years in the past. The total is down 9 per cent from 1928, about 2 per cent from 1927, approximately 6 per cent from 1926, and 2.4 per cent from 1923. Aside from the five years named the total was the highest for the eight months of any year we have had. It was at a daily rate equivalent to 44,800,000 tons for the year.

Electric and crucible ingots, as for several years, are not included in our figures. They have not been included since 1926. As they have recently accounted for about 1 per cent of the total ingot tonnage the first eight months of this year were very close to the corresponding figures for 1923. Production of electric and crucible ingots in 1929 averaged about 1725 tons to the working day.

Industrial Recovery Waits on Price Upturn

BY LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

PERHAPS the most encouraging sign which has appeared on the business horizon of late is the halt in the decline of wholesale commodity prices. Most students of business will agree that nothing could do more to improve business sentiment and stimulate buying than a stabilization of the prices of basic commodities.

Declining prices have not only indicated the existence of a maladjustment between supply and demand, and strained credit, but they have also reacted directly upon sentiment. A steady decline in commodity prices causes business men to cut purchases to a minimum and to see the future darkly. Accordingly, a cessation of the decline in prices and growing stability would both indicate a better balance between supply and demand and react favorably on business sentiment, stimulating postponed buying.

I think that this business recession will come to an end and the depressed condition be relieved not long after Bradstreet's index of commodity prices takes an upward trend. That index's performance is particularly good because, of all the standard indexes, it most nearly represents the movement of basic raw materials.

Nearly always, raw-material prices, begin to rise before business recovers from a depression and before the prices of finished commodities become stabilized. As the chart shows, the same observation applies to the relation between Bradstreet's index and finished steel prices. Recent evidence that a turn in raw-material prices may not be distant, therefore, deserves close attention. Briefly, the evidence is as follows:

(1) The Bradstreet index decreased only slightly between Aug. 1 and Sept. 1, and its whole course since the beginning of 1930 suggests a decline at a progressively less rapid rate—a concave curve. (2) Dun's index actually rose in the same period. (3) Various weekly price indexes have risen during the past two or three weeks, notably that of *Annalist*. (4) Various "sensitive" price indexes point upward; and such commodities as hogs, lard, tallow, steel scrap, coke, zinc, cotton, print cloths and worsted yarns are either higher or have been stable for several weeks. (5) The number of commodities show-

ing advances in price from week to week has gained on the number showing declines, until the two are nearly in balance. This is often a better indication of price trends than are the so-called averages, in which a wide swing in one commodity may offset movements in half a dozen others.

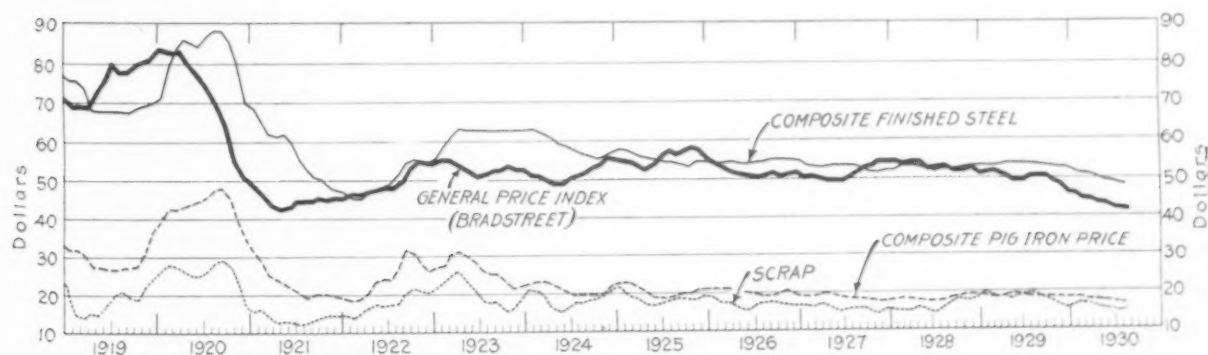
We could wish that the evidence rested less upon the action of the market and more upon underlying economic conditions. We could wish, too, that the recent firmness in certain prices were not due to drouth, with its offsetting losses. It can be said, however, that prices of several of the basic commodities are at levels which existed before war and post-war inflation. Also, in several cases, they are below cost of production. Therefore, real reason exists to call them cheap.

Cost cannot prevent further decline, but it can and will tend strongly to curtail production. Recognition, too, that a thing is "low enough" is a good background for buying sentiment when the price itself once appears to have steadied. Finally, it can be said that industrial production, as measured by the averages, is now so far below any conceivable long-term trend that shortages are "in the making."

There remain several obstacles:

(1) "In the making" is not equivalent to "made," and this is significant because stocks of commodities are very large in many important cases. Stocks of manufactured commodities, as a group, increased in July and, considering the season, were nearly back to the peak of January, 1929. This means continued pressure to liquidate. (2) Liquidation of credit is incomplete, notably in the case of collateral loans. (3) Readjustment of retail prices and inter-group relations must be carried further before complete equilibrium can be established. (4) Probably some further readjustment in wages must precede industrial expansion and increased employment and purchasing power of labor.

The chart illustrates one of the price maladjustments which still exists. Finished steel prices are relatively high. As to the upturn in steel scrap markets, it does not seem conclusive, being chiefly a seasonal matter and, for the rest, apparently due to temporary supply conditions rather than to the activity of demand.



When General Commodity Prices Start Their Advance, Business and Industry Will Follow Quickly

The Iron Age, September 11, 1930—719

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Recent Trends in Trade

IN the week ended Aug. 30 there was a notable drop in bank debits. The Department of Commerce weekly table of business movements, using index numbers based on 1923-4-5 as 100, shows debits to individual accounts outside New York City at 93.8, a decline from 110.0 the preceding week. It is particularly impressive that the number should drop below 100, when 100 represents a period six years ago.

A generalization has been possible for some time past that since early in the year trade has been growing progressively poorer. The exceptions are of small weight. For four or five months the various indexes of activity followed quite closely the seasonal variation of previous years, simply keeping their respective distances below last year and below the averages of previous years if not too many were taken. Thus automobile production in the first five months of the year, while well below last year, was a trifle above the average of the five years preceding last year. Then, in June, it became a trifle lighter, relative to the first five months, than the seasonal average would call for. In July and August it passed much below, and made the particular showing of being lighter in August than in July when ordinarily there is a slight trend the other way.

Bank debits having made such a remarkably poor showing for the week of Aug. 30, it seems well to make a thorough comparison of this very important item. As the week was the 35th of the year, it seemed advisable, when the great point is to determine what the trend of trade is within this year, its loss from other years being well known, to divide the 35 weeks of bank debits last year and this into three ten-week periods and one five-week period. This year makes the following showing:

Percentage Decrease, 1929 to 1930, in Check Payments Outside New York City

Periods of Weeks	Per Cent Decrease
First ten	11.3
Second ten	8.8
Third ten	14.4
Next five	23.6

In the second period this year fell slightly less behind last year than in the first period. The second period ended May 17. The third period showed a greater loss, but the comparison includes part of May and all of June, when trade last year was particularly active, more than merely seasonally so. Some allowance should be made for that, no doubt, but on the whole it looks as if there was some loss in the third period from the first 20 weeks, after allowance is made for seasonal variation.

The five weeks through Aug. 30 make an unmis-

takable showing, being off 23.6 per cent from last year, against an average 11.5 per cent decrease in the first 30 weeks. A comparison with 1928 would not make the same showing, but there was then an unseasonal rise in activity.

In previous issues, May 29 and Aug. 21, we have referred to freight car loadings showing no progressive gain this year, but rather a progressive loss. The downward divergence from the average of previous years was noticeable in June and became marked in July and through the week of Aug. 9. The two following weeks showed sharp increases but they merely equalled the increases of the same weeks in other years. The gap simply ceased widening.

It is quite possible, and many think it altogether likely, that trade losses have now ended. Fresh statistics as they come out will be scrutinized with particular interest. It will be an important event when recorded statistics confirm predictions of trade's beginning to recover.

Anti-Tariff Backfire

WHEN he was head of the Bureau of Foreign and Domestic Commerce in the Wilson administration, Dr. Edward Ewing Pratt showed on various occasions an intelligent interest in increasing American trade abroad. Since he left official life he has represented domestic exporters, first at home, and later abroad. At Paris last week, speaking as the representative of "an American organization with branches in twelve countries," he attacked the Hawley-Smoot tariff, charging that it "has done more to injure American foreign trade than any official act by the Government of the United States or any unofficial occurrence during the last generation." Like Dr. Nicholas Murray Butler, whose attacks on the tariff bill were warmly applauded by foreign audiences on his last trip abroad, Dr. Pratt has shown an appreciation of the anti-American attitude as a means of winning encomiums in Europe that is quite as high in its way as his opinion of the prevailing sentiment in his home land is low. That psychology is not new. Under its urge some Americans have even found expatriation easy.

We by no means approve of certain features of the new tariff act. It is a mixture of good and bad, as we already have had occasion to say. But how do men who want Europe to do business with their country really expect to help trade relations by joining in the uninformed and reckless hue and cry against the United States that found fresh stimulus in the mere introduction of a new tariff bill? Do

these American critics of American policies not see that this outburst over the new tariff is mostly echoes of the "Uncle Shylock" refrain that first rose in chorus from the Continental allies when war debt settlements were under way?

Most of the people of the United States believed it generous treatment of France, for example, that remitted practically all of her war-time debt to this nation and offered to settle with her for a sum representing little more than her after-the-war borrowings from us, with interest. Dire things were threatened then to our trade with Europe—things that did not happen—but there were notable increases in its volume until world-wide reaction became pronounced.

But coming back to Dr. Pratt's prediction of the ruinous effects of Europe's tariff-provoked animosity, one wonders why there should be such intense feeling where there is so little to lose. For the former chief of the Bureau of Foreign and Domestic Commerce assures us that

except in an exceedingly limited number of special industries which work under unusual conditions, Europe is totally and completely unable to compete with the United States. American business has practically nothing to fear from European competition. Even the old differences of prices are rapidly passing away. And as for merchandizing and sales methods, it is unthinkable that Europe will ever again become a serious factor in American markets, with or without our tariff.

We can conclude again that much that is said and written, both at home and abroad, of the effect of tariff policies on trade between nations is prompted more by political and theoretical considerations than by actual results as they appear in records of trade movements. Thus we see little headway on the proposal to take the tariff out of politics. In Great Britain just now the proposal to promote "inter-imperial trade" behind a tariff wall promises a sharp drawing of political lines between Conservatives and Liberals, almost to the exclusion of every other issue.

Heat Treating More and More

IN this, our annual heat-treatment issue, certain features of the signal progress in the fields of heat treatment are discussed with notable authority. There is that comparatively new process of nitriding, which promises so much in respect to the life and service of the parts so treated. A new nitralloy steel admits of ready machinability, an item making for wide usefulness. There seems to be no limit to the expectation of new advances. Heat treatment of both steel and aluminum has been the key to increasing the strength-weight ratio of materials, so important in aviation.

In the casting industry particularly noteworthy results have been achieved, and yet only a few years ago the suggestion that steel castings could profitably be quenched and tempered would bring scoffing. What is now becoming standard practice is increasingly regarded as the way to get the most out of a steel casting. The specially new developments are centered on the heat treatment of a gray iron casting.

In steel rails heat treatment appears to be having a revival. It is proving a large factor in the perfection of rustless steels. Beryllium, as in the case of vanadium some 30 years ago and molybdenum more recently, finds heat treatment essential to bring success to industrial applications of beryllium alloys, which already promise much. Heat treating with the years is cutting wider across the entire metal production field.

Labor Is Not Immune

A CORRESPONDENT writes us from a town in Massachusetts as follows:

A year ago last May the building mechanics raised their scale of wages. As we look backward we see that this was on the eve of the industrial depression. I had just previously contracted to erect a building on terms of cost plus 10 per cent, so the cost came to about 5 per cent more than anticipated, the labor element being about half the total. Such commitments kept labor pretty well employed through 1929.

By the early part of this year there was a good deal of unemployment. My own builder continued busy. This was owing to the high esteem in the community for his trustworthiness. Work being otherwise slack, he became able to select the cream of the artisans. With the advent of August, 1930, jobs were slack with him also and he was soliciting work at reduced rates, cutting his own managerial margin. I asked him if his laborers were assisting at all and he said not in the least; that on the contrary they were discussing an advance of wages, on the reasoning that if they could work only now and then they ought to get more per hour.

Some of the less skilled men, who have been longest out of work, have been earnestly seeking minor jobs at cut rates, *sub rosa*, explaining that they had to support their families.

This communication is an editorial in itself and is truly illuminating. Employers and employees are partners and their partnerships are affected in different degrees. Some of these partnerships are arranged on sliding scale agreements and consequently respond quickly. In others either the senior or junior partner may propose reductions in order to avert common starvation. So we grade up to what in Great Britain are called the sheltered trades, which think they are immune, but they are not so, for even they are subject to the competition of substitution.

The railroads lose their business to the automobile truck and bus and to pipe lines. The anthracite industry loses to oil, gas and hydroelectric power. The builders lose to the acceptance of the population to living on less floor space per family. The operation of old-fashioned theaters becomes difficult and the cinema appears as a cheaper substitute. And so on. Only in repair work does exaction seem to be able to hold its own, but even in that there is competitive amelioration. The staggering garage bills are still of occurrence, but more and more is there usage of the simpler cars that seem to be able to visit repair shops for moderate fees. More and more also are the people becoming able, by constraint, to do their own repairing, not only of automobiles but also of houses.

We do not find fault with labor for getting for itself all that it can. Every one does that. The attitude

of a considerable portion of it toward the realities of economic life is, however, decidedly stupid. No merchant would reason that owing to sales being slack it would be good policy to maintain, or mark up, prices and keep his shop open for only three days a week, and no intelligent monopoly would argue from its control of a commercial situation that its customers should have no consideration. Not even do the anthracite producers want to do that (which is not to charge them with being a monopoly), though their miners do.

Of course, the outcome is that the sheltered classes of labor work themselves out of full-time employment, and perhaps out of jobs altogether, and so produce the very unemployment whereof they complain. Indeed, it has been the high cost of labor that has been the direct incentive toward mechanization in mining, manufacturing and transportation. The railroads, for example, were bossed by the brotherhoods, legislatively assisted, and they bowed to the dictation, but they pressed improvements in methods so as to employ fewer brothers.

Heat-Treating Furnaces Become Production Machines

(Continued from page 685)

and heat liberation but, by furnace pressure control, the desired atmospheric condition is maintained so that no heavy scaling results when the work is at temperature.

Among the non-ferrous alloys, a non-oxidizing anneal of nickel-silver is being obtained in a continuous conveyor gas-fired furnace using this method of atmospheric control, and highly satisfactory results are obtained on brass. Hydrogen continues to be under much investigation for the bright annealing of chromium-nickel steels. It is being used successfully for bright annealing of nickel and nickel-silver strips.

Electrolene, developed for the creation of an artificial atmosphere in the electric furnace, offers possibilities in many heat-treating operations. It is the product of complete or partial thermal decomposition of manufactured gas, natural gas or butane, with or without steam, in an electrically heated producer to produce mixtures containing carbon monoxide, hydrogen and carbon dioxide as the main constituents.

Carburizing with gas under pressure is receiving considerable attention. Furnaces for nitriding are being developed with the objective, continuous or semi-continuous production. The mechanical circulation of furnace atmosphere with resulting uniformity of heat application is extending to higher temperatures than heretofore.

Interest in atmospheric control of heat-treating furnaces heated with oil, gas and electricity is widespread. The results of the research and development work now under way will probably be applied so rapidly in industry as to revolutionize our ideas of some heat-treating operations within a few years.

Fundamental Principles Govern the Trend

THE most casual observer cannot fail to have noticed the conversion of heat-treating equipment from a simple furnace to a production machine. After years of hesitation, the oil and gas furnace has

followed the lead of the electric furnace in points of design and application formerly considered superfluous in fuel-fired furnaces. This trend has resulted from the demand of the heat treater for production equipment heated with either oil, gas or electricity—so that a suitable choice can be made in accordance with local economic conditions.

In some plants the furnace is a machine located in the line of production, receiving its work and delivering its product just as any other machine. In others, the centralized heat-treating department is most practical, but now presents an entirely different appearance than that of the old heat-treating room. It is light, often painted white and well ventilated with the products of combustion removed when the source of heat makes it necessary. Improved working conditions have been found to pay a return.

Fundamentals, with the application of highly developed skill in furnace design and with the aid of heat-resisting alloys, are governing the trend of the modern heat-treating furnace in the solution of the problem in heat treatment—quality production at a low over-all cost of finished product. The design of the modern furnace indicates recognition of the dependency of quality upon the production of a uniformly heated product in a suitable heating atmosphere, and that the uniformly heated product involves:

- (1) the application of heat uniformly to the entire surface of the charge;
- (2) heating the charge at the proper rate to the correct temperature; and
- (3) holding the charge at the correct temperature for the period of time necessary for complete saturation.

All of these factors in the production of a uniformly heated product, the essential of quality heat treatment, will probably be combined in the automatic heat-treating furnace of the future.

Electrical Resistance Between Nuts and Bolts

FREQUENTLY the construction of electrical equipment is such that the circuit includes one or more contacts between nuts and bolts, or between threaded holes and machined screws. While it is reasonable to assume that such contacts have a negligible resistance, little if any definite information seems to be available.

An investigation was undertaken at the Bureau of Standards to obtain at least some reliable data on the subject. Measurements of the contact resistance were made, using two radically different types of threads, four different materials, and a wide range of mechanical stresses. The types of threads used were the American National form of thread and the Dardelet. The materials used were copper, bronze, brass and steel, and the mechanical stresses in the bolts extended from near zero well up toward the elastic limit.

It was found that the contact resistance decreases to a marked extent as the stress increases, and is only about one-fourth as large with the Dardelet thread as with the American National coarse thread. Further, in all or practically all cases, the resistance is so small as to be almost negligible. This subject is reported upon more fully in the September number of the Bureau of Standards *Journal of Research*.

No Marked Recovery in Steel Demand Yet Evident

▲ ▲ ▲
INGOT Output Gains Despite
Decline in Number of Active
Blast Furnaces—Scrap Up at
Pittsburgh—Reading Buys Rails
▼ ▼ ▼

SEASONAL recovery in iron and steel, although confidently expected by the trade, is slow in materializing. Demand for finished steel thus far this month has been moderately larger than in the corresponding part of August, but nothing resembling a broad buying movement has set in and the persistence of discordant market tendencies continues to obscure the outlook.

Curtailment of pig iron production, which, according to complete returns, amounted to 4.6 per cent in August, is apparently still under way. Following a net loss last month of five active blast furnaces, of which four were steel works units, four additional furnaces have been taken out of service so far in September, three of them steel plant stacks.

This evidence of an unchecked decline in the pig iron requirements of steel producers is in sharp contrast with the increase of 5.5 per cent in steel ingot output in August and the further gain this month indicated by current estimates. Present ingot production is fully 58 per cent of today's capacity (which is 3 to 4 per cent larger than the total officially reported at the close of 1929) and is $1\frac{1}{2}$ per cent higher than the average for last month.

This gain in steel also contrasts with market tendencies in pig iron. Open market offerings of steel company pig iron are increasing, particularly in the Chicago district, and the large stocks of merchant producers give no clear indication of early reduction, with one merchant furnace reported banked in the past week and another scheduled to go out within a few days. At Cleveland, prices on foundry iron for local delivery have receded 50c. a ton, and 50c. concessions on attractive tonnages are reported at Chicago.

Scrap markets, on the other hand, are holding their own, with heavy melting grade up 25c. a ton at Pittsburgh.

While these conflicting factors are confusing, they are ignored by leaders in the steel trade, who are convinced that the rock-bottom replacement requirements of an economically strong and growing country exceed a 50 to 60 per cent production in the most basic industry, and for that reason alone some measure of recovery is inevitable. This view finds support in an increase in miscellaneous orders for steel, indicating a revival of interest on the part of many consumers who have not been in the market recently. Some forward buying has also developed, particularly in light rolled products, makers of which gave cus-

tomers an opportunity to get under cover at prices prevailing before recent advances.

The customary fall and winter rail buying movement, even if smaller than a year ago, is likewise relied on to improve mill bookings. The Reading has placed 30,000 tons and the Lackawanna 2500 tons, while the New York Central Lines are expected to enter the market shortly for 150,000 tons.

A purchase of 305 freight cars and 11 locomotives by the Lehigh & New England raises the hope that the fall will see some betterment in railroad equipment buying, although large current surpluses of rolling stock offer little encouragement in that direction.

The effects of the drought have not yet been fully measured except in the case of tin plate. It is now clear that the canning crop will show little decrease from that of last year. Large releases from the can companies have enabled the tin mills to continue operations at an average of 70 per cent of capacity, with the leading interest scheduled at a considerably higher rate.

The loss in steel business chargeable to the damage to field crops remains of uncertain proportions. Demand for wire products in the South is responding slowly to the stimulus of the fall buying season. Jobbers are not buying ahead, but are awaiting their cue from customers, especially in lines that reach the farmer. Sales of stoves in agricultural sections are reported light, while farm implement makers are experiencing difficulty in determining their fall production schedules, which normally get under way by Oct. 1.

Prospects in the automobile industry are not encouraging. September, it is feared, will do well if it duplicates the disappointing production of August.

Structural steel awards, at 34,000 tons, are of average proportions. Radio producers have expanded their operations materially since Sept. 1, correspondingly increasing their specifications for electrical sheets. An aircraft carrier to be placed by the Navy will require 7880 tons of finished steel and 150 tons of castings.

The collapse of Cartel control of European export prices has been followed by sharp concessions to the British trade, forcing one English steel mill to suspend operations.

THE IRON AGE composite price for scrap has advanced from \$13.67 to \$13.75 a gross ton. It is now 67c. higher than five weeks ago. The pig iron composite is unchanged at \$16.88 a gross ton, and the finished steel figure at 2.142c. a lb.

PITTSBURGH

Steel Consumers Taking More Interest in Market—Operations Unchanged

PITTSBURGH, Sept. 9.—With tangible evidence of definite improvement in business still lacking, the steel industry in the district nevertheless is of the opinion that a seasonal upturn will occur before the end of the month. In a few cases specifications last week showed some increase over the August average, but this may have been attributable to a normal pickup at the beginning of the month. Tonnage releases this week do not show corresponding gains.

In spite of this, consumer interest in future requirements continues, and prospects of price advances have brought out inquiry from many consuming lines which have been dormant during the summer. Even jobbers, who have been ordering steel with extreme caution in order to maintain minimum inventories, seem disposed to make larger commitments just now and a few have covered their needs for the remainder of the year.

Price advances on flat-rolled steel products are not yet established. In some cases, large buyers have been able to cover for the remainder of the year at recent minimum figures. On bars, shapes and plates, mills are making no effort to encourage fourth quarter contracting, but are generally willing to take business at 1.65c., Pittsburgh, which would represent an advance of \$1 a ton over recent going prices. Other products are held at recent levels, with no more than the usual amount of shading.

Steel ingot operations in the Pittsburgh district are essentially unchanged at about 55 per cent of capacity, with the leading interest maintaining a slightly higher rate. Independent companies plan increases next week to take care of limited improvement in finishing mill schedules this week. In the Valleys and Wheeling district no change in open-hearth operations is reported, although sheet mill production has increased a shade in the Youngstown district.

A 25c. increase in heavy melting scrap prices is the feature of the market on primary materials. This resulted from prices named on recent railroad lists and not from further mill buying. Pig iron continues quiet, with prices unchanged.

Pig Iron

Nothing has been reported thus far in the month to indicate any departure from the dullness which has characterized the pig iron market during the summer. Consumers are buying in carload lots for prompt shipment, and in most cases are paying the full quoted prices. One seller believes shipments to the radiator and sanitary ware foundries are begin-

Seasonal upturn in steel orders expected to develop before the end of this month.

* * *

Consumer interest in future requirements continues, with some contracting to the end of the year.

* * *

Prospects of stiffening in prices have brought out inquiries from many consuming lines.

* * *

Heavy melting steel scrap registers further advance of 25c. a ton.

* * *

Steel ingot operations remain substantially unchanged, but may improve next week.

ning to show improvement this month, but the tendency does not seem to be general. A local broker is seeking quotations on 1000 tons of basic iron for delivery to a Valley consumer. Steel companies have received this inquiry, but no bids are reported. No change in blast furnace operations is reported. Stocks of all kinds of iron are ample. Prices quoted below are still nominal and are not supported by the test of substantial buying.

Prices per gross ton, f.o.b. Valley furnace:
Basic\$18.00
Bessemer18.50
Gray forge17.50
No. 2 foundry18.00
No. 3 foundry17.50
Malleable18.50
Low phos., copper free.....\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:
Basic\$18.50
No. 2 foundry18.50
No. 3 foundry18.00
Malleable19.00

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Bars, Plates and Shapes

Slight gains in both new orders and specifications for heavy hot-rolled steel products are reported from a number of sources. It is difficult to say whether this increase will be continued, or whether it is merely a reflection of the slightly heavier movement which ordinarily occurs in the first week of the month. Nevertheless, consumers are showing more interest in their last quarter requirements, and some of them who have been buying on a hand-to-mouth basis during the summer are now willing to make commitments at the present low price levels. Talk of price advances is also stimulating.

Structural awards have not been heavy, but considerable work is in

prospect on which inquiry will come out before the end of the year. During the next two weeks the State of Kentucky will take bids on its forthcoming highway program, bridges for which will take approximately 20,000 tons of structural steel and 3000 tons of reinforcing bars. Reinforcing bar business especially showed activity last week, and new business continues to bulk rather large. A recent survey of the barge business in this district indicates that at least 150 units for river service are now being contemplated, and will certainly be placed within another year. As yet, actual inquiry has not come out on any of this equipment. Barge yards need business badly, as all except one or two in the district have maintained only skeleton crews for several months.

Merchant bars are not so active, and improved business seems to be slow in coming. Shipments to the automobile industry are light, and alloy steel bars continue rather dull. Recent talk of price advances has not stimulated mills to make any definite announcement regarding fourth quarter quotations, but it is reported that efforts will be made to maintain 1.65c., Pittsburgh, which has been the official quotation of mills in spite of frequent shading.

Semi-Finished Steel

Shipments so far this month have averaged about the same as in the corresponding period last month, although releases from a few non-integrated strip and sheet mills are showing some improvement. No new buying of billets, slabs and sheet bars is reported, with the market still nominally quotable at \$31, Pittsburgh or Youngstown. The price of forging billets is unchanged at \$36, Pittsburgh, with occasional spot sales being made at this figure. Wire rods are very dull, with shipments light to bolt, nut and rivet makers. The price is unchanged at \$36, Pittsburgh or Cleveland.

Tubular Goods

The pipe market is still rather quiet, although considerable line pipe tonnage is in prospect which may be placed this year. Mills making the larger sizes of line pipe are well occupied, and seamless units are running well on material 10 in. and larger. No improvement is in sight for standard tubing, and shipments continue 20 to 25 per cent under the average for this time of the year. Oil country casing is in fair demand from mid-continent fields, but very little material is going to the Pacific Coast. Mechanical

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Sept. 9, 1930	Sept. 2, 1930	Aug. 12, 1930	Sept. 10, 1929
No. 2 fdy., Philadelphia.....	\$19.76	\$19.76	\$19.76	\$21.26
No. 2, Valley furnace.....	18.00	18.00	18.00	18.50
No. 2 Southern, Cin'tl.....	15.69	15.69	15.69	17.19
No. 2, Birmingham.....	14.00	14.00	14.00	14.50
No. 2 foundry, Chicago.....	17.50	17.50	17.50	20.00
Basic, del'd eastern Pa.....	18.75	18.75	18.75	19.75
Basic, Valley furnace.....	18.00	18.00	18.00	18.50
Valley Bessemer, del'd P'gh.	20.26	20.26	20.26	20.76
Malleable, Chicago*.....	17.50	17.50	17.50	20.00
Malleable, Valley.....	18.50	18.50	18.50	19.00
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	94.00	94.00	94.00	105.00

Rails, Billets, Etc., Per Gross Ton:

Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh.	31.00	31.00	31.00	35.00
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00
Forging billets, Pittsburgh....	36.00	36.00	36.00	40.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.70	1.70	1.70	1.85

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.65	1.95
Bars, Chicago.....	1.70	1.75	1.75	2.05
Bars, Cleveland.....	1.70	1.70	1.75	1.95
Bars, New York.....	1.93	1.93	1.98	2.29
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.95
Tank plates, Chicago.....	1.70	1.75	1.75	2.05
Tank plates, New York.....	1.88	1.88	1.88	2.22 1/2
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.95
Structural shapes, Chicago....	1.70	1.75	1.75	2.05
Structural shapes, New York	1.80 1/2	1.80 1/2	1.85 1/2	2.19 1/2
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh.	1.65	1.65	1.65	1.90
Cold-rolled strips, Pittsburgh.	2.35	2.35	2.35	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,

Per Lb. to Large Buyers:	Sept. 9, 1930	Sept. 2, 1930	Aug. 12, 1930	Sept. 10, 1929
Sheets, black, No. 24, P'gh..	2.40	2.40	2.45	2.85
Sheets, black, No. 24, Chicago	2.50	2.50	2.55	2.95
dist. mill.....	3.00	3.00	3.05	3.50
Sheets, galv., No. 24, P'gh..	3.10	3.10	3.20	3.60
dist. mill.....	2.05	2.05	2.05	2.35
Sheets, blue, No. 13, P'gh....	2.25	2.25	2.25	2.45
dist. mill.....	2.00	2.00	2.05	2.55
Wire nails, Pittsburgh.....	2.10	2.10	2.10	2.60
Wire nails, Chicago dist. mill.	2.30	2.30	2.30	2.40
Plain wire, Pittsburgh.....	2.35	2.35	2.35	2.45
Plain wire, Chicago dist. mill	2.70	2.70	2.80	3.20
Barbed wire, galv., Pittsburgh	2.85	2.85	2.85	3.30
Barbed wire, galv., Chicago	5.25	5.25	5.25	5.35
dist. mill.....				
Tin plate, 100 lb. box, P'gh..				

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$15.75	\$15.50	\$15.00	\$18.25
Heavy melting steel, Phila....	13.00	13.00	12.50	16.50
Heavy melting steel, Ch'go....	12.50	12.50	12.00	15.25
Carwheels, Chicago.....	13.50	13.50	13.50	14.00
Carwheels, Philadelphia.....	15.00	15.00	14.50	16.50
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50
No. 1 cast, Philadelphia.....	13.00	13.00	13.00	16.50
No. 1 cast, Ch'go (net ton)....	11.50	12.00	12.00	14.50
No. 1 RR. wrot., Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	10.00	10.00	10.00	14.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$2.65
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	11.12 1/2	11.12 1/2	11.12 1/2	18.12 1/2
Electrolytic copper, refinery..	10.50	10.50	10.75	17.75
Tin (Strait), New York.....	29.87 1/2	29.75	30.00	45.37 1/2
Zinc, East St. Louis.....	4.30	4.35	4.32 1/2	6.80
Zinc, New York.....	4.65	4.70	4.67 1/2	7.15
Lead, St. Louis.....	5.35	5.35	5.35	6.70
Lead, New York.....	5.50	5.50	5.50	6.90
Antimony (Asiatic), N. Y. ..	7.75	7.75	7.75	8.75

tubing is very dull, although boiler tubes are moving fairly well.

Bolts, Nuts and Rivets

Little change is reported in the rate of specifications this month, and operations by leading bolt and nut makers average about 45 per cent of capacity. Prices are holding comparatively well at 73 per cent off list for bolts and nuts, and 70, 10 and 5 for small rivets. Large rivets are quotable at \$2.75 per 100 lb.

Sheets

Following the announcement of a stronger price policy by leading independent companies last week, the sheet market developed considerable activity. Large buyers have placed contracts for the remainder of the year in some cases, and in occasional instances concessions from the newly established prices were made. While it is yet too early to ascertain whether the newly announced quotations will become effective, it does seem likely that considerable tonnage will be shipped during the fourth quarter at lower figures. Very little of the new buying last week came from the automobile industry, while considerable tonnage was taken from

steel barrel and drum makers, makers of galvanized metal ware and enameling plants. Although a few automobile builders seem likely to continue present schedules for some time, the prospects of improvement are not good, and most steel makers realize that they can expect little more this year from the automobile industry; at least, little more in the way of improvement. Sheet mill operations last week averaged under 50 per cent, but slight improvement in a number of plants may increase this figure moderately this week.

Strip Steel

Despite a stronger price policy, which has been adopted by leading makers of strip steel, business has failed to show any marked improvement. In connection with the advance in sheet prices last week, makers of strip steel announced that minimum prices for the fourth quarter would be 1.65c. and 1.75c. on hot-rolled strip, and 2.35c. to 2.45c. on cold-rolled. Although these figures have represented the quoted market for some time, shading had become rather common, particularly on the wider sizes of hot-rolled material, and such concessions have not yet entirely disappeared. Strip operations are very light, al-

though a few mills were able to start off this week with somewhat higher schedules.

Wire Products

A few makers report a slight increase in specifications for manufacturers' wire, but improvement is by no means general. Merchant wire products continue very dull, although shipments of fencing to the South and Southwest are beginning, following recent announcement of dating terms. Prices are generally unchanged, although at least one Pittsburgh mill is now quoting nails at \$2, Pittsburgh, for shipment outside of the district, and maintaining \$2.05 in the immediate Pittsburgh territory. Manufacturers' wire is holding at 2.30c.

Tin Plate

Shipments increased again last week, and specifications from container manufacturers continue to come in at a good rate. Estimates of the canning crop now indicate that there will be little decrease from last year, and the loss in tin plate consumption from other sources will not be heavy. Drought conditions during July and August apparently will prevent the canning industry from put-

THE IRON AGE COMPOSITE PRICES

Finished Steel		Pig Iron	Steel Scrap
Sept. 9, 1930	2.142c. a Lb.	\$16.88 a Gross Ton	\$13.75 a Gross Ton
One week ago	2.142c.	16.88	13.67
One month ago	2.156c.	16.88	13.17
One year ago	2.398c.	18.25	16.67
Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.		Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.
High Low		High Low	High Low
1930.....	2.362c., Jan. 7; 2.142c., Aug. 26	\$18.21, Jan. 7; \$16.88, Aug. 12	\$15.00, Feb. 18; \$13.08, July 1
1929.....	2.412c., April 2; 2.362c., Oct. 29	18.71, May 14; 18.21, Dec. 17	17.58, Jan. 29; 14.08, Dec. 3
1928.....	2.391c., Dec. 11; 2.314c., Jan. 3	18.59, Nov. 27; 17.04, July 24	16.50, Dec. 31; 13.08, July 2
1927.....	2.453c., Jan. 4; 2.293c., Oct. 25	19.71, Jan. 4; 17.54, Nov. 1	15.25, Jan. 11; 13.08, Nov. 22
1926.....	2.453c., Jan. 5; 2.403c., May 18	21.54, Jan. 5; 19.46, July 13	17.25, Jan. 6; 14.00, June 1
1925.....	2.560c., Jan. 6; 2.396c., Aug. 18	22.50, Jan. 13; 18.96, July 7	20.83, Jan. 13; 15.08, May 5

ting up any surplus, and this factor may strengthen the situation next year. Operations continue at about 70 per cent of capacity, with the leading interest scheduled this week at a considerably higher rate.

Cold-Finished Steel Bars

While no appreciable increase in business is reported, makers are taking encouragement from the fact that prices are being fairly well maintained in most consuming districts. Although concessions appear from time to time in the Detroit territory, this is not unusual, and in other districts current tonnage is regularly bringing 2.10c., Pittsburgh. The cold-finished industry is running at about 40 per cent of capacity, and releases thus far in September indicate a gradual improvement before the end of the month.

Coke

The coke market is holding its own and production has expanded a little in the Connellsville district. This is not due to improved blast furnace consumption, but rather to heavier specifications from foundries and to the beginning of the domestic coke season. Furnace coke is still quotable at \$2.60 to \$2.65, Connellsville, and little distress material is being offered at lower figures. Foundry cullings are being sold at \$2.40, Connellsville. Foundry coke prices are unchanged.

Old Material

The scrap market has gained strength following the closing of monthly railroad lists in this district as well as in the East. The No. 1 heavy melting steel in the Pennsylvania Railroad offering is reported to have brought \$16.25 for delivery at a point in this district, and other smaller lists were picked up by brokers at prices ranging from \$15.50 to \$16. The market thus becomes quotable at \$15.50 to \$16, the former representing the price which most brokers are forced to pay to secure a good grade of scrap to cover old orders.

Other grades of scrap also reflect the strength in No. 1 steel, although hydraulic compressed sheets are nominally unchanged because of lack of buying in this district. Practically no Detroit scrap is coming into Pittsburgh, and a quotation of \$15 to \$15.50 fairly represents the market on local

material. The blast furnace grades have advanced, following a substantial purchase by one mill at \$9, and specialties have retained their recent strength.

The trade is now less inclined to believe that recent large purchases of scrap in this district at what seemed to be high figures were made principally to hold up the market. It appears that the low schedules of finishing mills, whose scrap ordinarily returns to nearby open-hearths, have considerably cut down this source of material and that plants which can ordinarily be satisfied in this way have recently been forced into the open market for their supply. Open-hearth operations are gradually increasing in the district, and when this improvement precedes a stepping up in finishing mill schedules it is only logical to expect a stronger scrap market.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel..	\$15.50 to \$16.00
No. 2 heavy melting steel..	12.75 to 13.25
Scrap rails	15.00 to 15.50

Warehouse Prices, f.o.b. Pittsburgh

*Base per Lb.

Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes...	2.75c.
Reinforcing steel bars	2.75c.
Cold finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.50c.
Blue annealed sheets (No. 13)	2.65c.
Galv. corrug. sheets (No. 28), per square	\$4.25
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.30
Wire, black, soft ann'd, base per 100 lb.	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.65 to 2.80

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

Compressed sheet steel....	15.00 to 15.50
Bundled sheets, sides and ends	13.00 to 14.00
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary..	15.50 to 16.00
Heavy breakable cast.....	11.50 to 12.00
No. 2 railroad wrought....	15.50 to 16.00
Hvy. steel axle turnings...	12.50 to 13.00
Machine shop turnings....	8.00 to 8.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	17.50 to 18.00
Railr. coll and leaf springs	17.50 to 18.00
Rolled steel wheels.....	17.50 to 18.00
Low phos. billet and bloom ends	20.00 to 21.00
Low phos. mill plates....	17.00 to 17.50
Low phos. light grades....	17.00 to 17.50
Low phos. sheet bar crops	18.00 to 18.50
Heavy steel axle turnings..	12.50 to 13.00
Electric Furnace Grades:	
Low phos. punchings....	17.00 to 17.50
Heavy steel axle turnings..	12.50 to 13.00
Blast Furnace Grades:	
Short shovelling steel turnings	8.75 to 9.25
Short mixed borings and turnings	8.75 to 9.25
Cast iron borings.....	8.75 to 9.25
Rolling Mill Grades:	
Steel car axles.....	21.50 to 22.50
Cupola Grades:	
No. 1 cast.....	13.00 to 14.00
Rails 3 ft. and under....	16.50 to 17.00

Industrial Building Costs Lowest in Eight Years

Industrial building costs are the lowest in eight years, according to a survey of the Austin Co., Cleveland. Except for a period in 1922, costs have not been so low since 1916.

All of the decline is due largely to falling prices of materials and greater efficiency of labor and construction equipment. Wage rates at 185 per cent over the 1913 level continue at the peak for all time, while all building costs, including labor, are less than 40 per cent over 1913.

A modern factory building, 200 ft. long and 100 ft. wide, of steel and concrete construction can be erected in the average Midwestern city for \$1.40 a sq. ft., against \$1.87 in 1923, a high mark of \$2.65 in 1920 and \$1 in 1913, the company states. The decline in costs is resulting in a marked increase in inquiries from manufacturers contemplating new construction, according to the Austin Co. officials.

The fall meeting of the American Drop Forging Institute will be held at Briarcliff Lodge, Briarcliff, N. Y., on Oct. 9, 10 and 11. F. W. Sinram, Gears & Forgings, Inc., Cleveland, is chairman of the convention committee.

CHICAGO

Pig Iron Production Lower—Ingot Output Unchanged—Bars, Shapes and Plates Off \$1

CHICAGO, Sept. 9.—Ingot output remains at close to 57 per cent of capacity, but pig iron production is again losing ground because of rather heavy accumulations in producers' yards.

Bars, shapes and plates are off \$1 a ton on attractive business, and quotations on pig iron lack strength. On the other hand, local producers are opening fourth quarter books on sheets and are attempting to advance prices.

New buying in finished steel seems to have struck a dead level, which at best is holding backlogs steady. Current specifications are supporting operations, but do not show a tendency to expand as was the case a week ago.

The Inland Steel Co. has taken a stack out of service. The leading interest continues to blow 11 furnaces and to hold three banked. The count of active steel mill stacks now stands at 16 against 17 at the end of August. The merchant stack at Duluth has been banked, leaving four merchant furnaces active in this district.

Operations at industrial plants in this district are spotty, and marked improvement in this situation does not appear to be at hand. Dearth of railroad car business is bringing about reductions of working forces at car shops, and railroads continue to practice economy in the matter of extensive and heavy repair programs. If the attitude of structural fabricators can be taken as a guide, little can be expected in the way of a larger building program during the remainder of this year. Promise of betterment comes from manufacturers of farm implements, which are making close surveys of their needs for fall production schedules, which normally are under way by Oct. 1.

Warehouse Business

Incoming orders are a trifle larger. Prices are steady except on black sheets, which are now quotable at 3.80c. a lb., and on galvanized sheets, which are priced at 4.35c.

Pig Iron

Prices for Northern foundry iron are giving ground when large tonnages are involved, occasional concessions of 50c. a ton having been made. Buying remains consistent and in larger lots, most of which are for the remainder of the year. Only four merchant furnaces are now in blast in this district, the furnace at Duluth having been banked this week. The Southern iron market is quiet, with quotations on small lots at \$12 a ton. The silvery market is quiet and prices remain unsettled, a situation which may exist for some time because of low consumption and the

Steel business shows no further gain for the week, with ingot output holding at 57 per cent.

* * *

Bars, shapes and plates are off \$1 a ton on attractive tonnages.

* * *

One steel company furnace and one merchant furnace have gone out of service.

* * *

Occasional concessions of 50c. a ton granted on pig iron in large tonnages.

* * *

Operations of industrial plants spotty, and marked improvement is not yet in sight.

fact that not less than 5000 tons is stored on a local dock. A user in Wisconsin is inquiring for five cars of the 10 per cent grade.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil. High phosphorus	17.50
Lake Super. charc'l, sil. 1.50	27.04
S'th'n No. 2 fdy.	\$18.01 to 18.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent.	27.29
Bess. ferro-silicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates

Prices for plates, which have been showing signs of weakness recently, have definitely settled to a range of 1.70c. to 1.75c. a lb., Chicago. The higher quotation is still holding on most of the miscellaneous business, but sizable tonnages, especially when purchased for a specific order, can readily be had at the lower quotation.

Demand for plates for line pipe shows no abatement and shipping records, which were broken in August, may be surpassed by deliveries this month. Notwithstanding the heavy volume of shipments for this specific use, mills are in general reserving space on rolling schedules for the general run of orders and therefore deliveries on practically all sizes are prompt.

A fabricator in the Pittsburgh district has been awarded 1500 tons for a water intake pipe for East Chicago, Ind. Orders for tanks are almost wholly absent from the market, but inquiries of 6000 tons bring the total business in prospect to 18,000 tons.

There is little of promise in the

railroad equipment market. It appears to have been a rather general practice for most railroads to cut expenditures since about the first of the year. Because of this, little shop work has been done, and heavy repairs may soon be urgently needed. It is believed by sellers of steel that stocks in the hands of railroad store departments are low and that as soon as more extensive repairs are needed tonnage will come to mill books.

Structural Material

Sellers are accepting 1.70c. a lb., Chicago, for shapes when attractive tonnages are involved, and the market is quotable at 1.70c. to 1.75c. The local structural market continues to follow its recent course, with this week's volume one of the lightest in some time. Architects have been diligent in preparing plans, but financing has not been easy in all cases despite the abundance of funds. The public seems little interested in bonds issued against real estate, and it is thought that building will not be resumed here on a large scale until the public attitude toward this type of investment undergoes a change.

Bars

Moderate improvement in demand for bars is noted in a market which is now quotable at 1.70c. to 1.75c. a lb., Chicago, for mild steel. Mills are now willing to accept business for delivery in the final quarter, but so far users are showing little interest beyond such tonnages as they need for immediate shipment.

Shipments of alloy steel bars show moderate gains, but demand is fluctuating and the outlook is uncertain.

Rail steel bars are moving in small lots for nearby shipment at 1.65c. a lb., Chicago Heights. New business of this character is gaining headway after many weeks in which little or no improvement was noticeable. Despite the drought in many farm sections, steel fence post orders are not far from normal volume for the second week in September.

Wire Products

Fourth quarter books, which were opened last week, have grown little. Contracts are being signed from day to day, but most users are inclined to cut commitments closer than is usually their practice for the last three months of the year. Efforts are being made to stabilize the price structure, but varying quotations are still the rule in some sections, this being especially noticeable in nails, which are in light demand for this time of the year. Specifications are no broader than a week ago. The manu-

facturing trade finds no greater use for wire products, and jobbers in most parts of the country report business as quiet.

Cold-Rolled Strips

Releases have gained a trifle, but output still remains under 50 per cent of capacity. Fourth quarter books are open at 2.35c. to 2.45c., a lb., Cleveland.

Hot-Rolled Strips

Mills have opened fourth quarter books at 1.85c. a lb., Chicago, for 6 in. and narrower and at 1.75c. for widths above 6 in. Demand remains light and spotty.

Rails and Track Supplies

Miscellaneous orders for standard-section rails aggregate several thousand tons. The expected 1931 buying movement has not as yet started, but some inquiries are expected soon. The probable extent of new rail purchases is still very much in doubt. The light rail market is quiet, though recently orders were fairly numerous from the coal mining industry, which is getting under way for the fall and winter trade.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe

This market is moderately active. Racine, Wis., has awarded 600 tons of 24-in. pipe, and Joliet, Ill., has placed 10,000 ft. of 6 to 12-in. pipe with an unnamed bidder. Among new inquiries are 130,000 ft. of 8-in. pipe, on which bids were opened Sept. 8 by Detroit; 27,000 ft. of 6 and 8-in. pipe for St. Clair Shores, Mich., and about 5000 ft. of 6 and 12-in. Class C pipe for the University of Wisconsin, Madison, Wis.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44 to \$46; 4-in., \$47 to \$49; Class A and gas pipe, \$3 extra.

Bolts, Nuts and Rivets

This market remains quiet. Contracts for the next quarter are being offered to consumers. Prices, except for large rivets, are steady.

Sheets

Western producers are opening books for the last quarter and some of them are making efforts to get prices that are higher than have recently prevailed in this market. Black sheets are being quoted at 2.55c. a lb., Chicago district mill, and the galvanized product at 3.20c. Tests are lacking which will show whether advances can be put into effect at this time. The general demand for sheets shows no improvement over the level a week ago, and hot mill operations remain in the range of 50 to 55 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.55c. to 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann'l'd, 2.15c. *Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.*

Reinforcing Bars

Price fluctuations are again adding to the troubles of local bar shops. Both sales and inquiries are disappointing to the trade and, as shop schedules are reduced, the keenness of competition, especially where attractive tonnages are involved, brings weakness in prices. This week's business is widely scattered and, for the most part, involves orders of 50 tons and less. Reinforcing bars are being ordered for Cook County, Ill., bridges, and new State work will come up for figures in the next week or two. The market is getting most of its support from public work.

Coke

September shipments of by-product foundry coke are about on a par with the average of August. The price is steady at \$8 a ton, f.o.b. local ovens.

Old Material

Inquiry, which has been dormant for many weeks, is again making its way into this market, and the impression is growing that the market as a whole is gaining strength. A weak spot is showing in heavy melting steel for the reason that mills continue to restrict shipments and dealers are having some difficulty in placing cars as they appear on track. This situation cannot be taken, however, to mean that a troublesome surplus is accumulating because scrap is being gathered slowly, and stocks in yard dealers' hands are small. Short rails and steel angles are 25c. a ton higher in a more active market, but machinery cast is off 50c. because of lack of demand. Local production of hy-

draulic bundles is light, and shipments are still coming in from a wide territory.

Prices deliv'd Chicago district consumers: Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.50 to \$13.00
Shoveling steel.....	12.00 to 12.25
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.25 to 10.75
Drop forge flashings.....	8.50 to 9.00
No. 1 busheling.....	9.50 to 10.00
Forg'd cast and r'l'd steel carwheels.....	15.00 to 15.50
Railroad tires, charg. box size.....	15.50 to 16.00
Railroad leaf springs cut apart.....	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	13.50 to 14.00
Coil springs.....	16.00 to 16.50
Electric Furnace Grades:	
Axle turnings.....	11.25 to 11.75
Low phos. punchings.....	13.00 to 13.50
Low phos. plates, 12 in. and under.....	13.00 to 13.50
Blast Furnace Grades:	
Axle turnings.....	9.50 to 10.00
Cast iron borings.....	7.75 to 8.25
Short shoveling turnings..	7.75 to 8.25
Machine shop turnings....	6.00 to 6.50
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.50 to 15.00
Cupola Grades:	
Steel rails, less than 3 ft..	14.00 to 14.50
Steel rails, less than 2 ft..	14.75 to 15.25
Angle bars, steel.....	13.50 to 14.00
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	12.50 to 12.75
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.	12.00 to 12.50
Iron arch bars and transoms.....	13.50 to 14.00
Iron car axles.....	21.50 to 22.00
Steel car axles.....	15.00 to 15.50
No. 1 railroad wrought....	9.75 to 10.25
No. 2 railroad wrought....	11.00 to 11.50
No. 1 busheling.....	7.50 to 8.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast....	11.50 to 12.00
No. 1 railroad cast.....	10.00 to 10.50
No. 1 agricultural cast....	9.50 to 10.00
Stove plate.....	9.50 to 10.00
Grate bars.....	8.50 to 9.00
Brake shoes.....	8.50 to 9.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Dealers Bidding Up Prices on Steel Scrap at Detroit

DETROIT, Sept. 9.—Although steel companies are well supplied with scrap and therefore are showing little interest in making further purchases, local dealers are bidding aggressively for open-hearth grades. Anticipating a pickup in demand, they are paying 25c. a ton higher for hydraulic compressed sheets. Blast furnace and foundry grades are weak. The Pennsylvania Railroad is reported to have received considerably higher prices on certain items this month than last.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel.....	\$11.25 to \$11.75
Borings and short turnings	5.75 to 6.25
Long turnings.....	5.75 to 6.25
No. 1 machinery cast.....	11.00 to 11.50
Automotive cast.....	12.25 to 12.75
Hydraul. comp. sheets.....	11.25 to 11.75
Stove plate.....	9.00 to 9.50
New No. 1 busheling.....	9.50 to 10.00
Old No. 2 busheling.....	5.50 to 6.00
Sheet clippings.....	8.00 to 8.50
Flashings.....	10.00 to 10.50

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.00c.
Soft steel bars.....	2.90c.
Reinforc'g bars, billet steel—	
Less than 5 tons.....	2.85c.
5 tons to 30 tons.....	2.45c.
30 tons to 200 tons.....	2.00c.
200 tons and over.....	1.85c.
Rail steel reinforcement—	
Less than 5 tons.....	2.50c.
5 tons to 30 tons.....	2.10c.
30 tons and over.....	1.50c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.35c.
Flats and squares.....	3.85c.
Bands (¾ in. in Nos. 10 and 12 gages).....	3.10c.
Hoops (No. 14 gage and lighter)...	3.65c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes (¾ in. and larger).....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts.....	60 and 10
Carriage bolts.....	60 and 10
Coach or lag screws.....	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg.....	\$2.30 to 2.55
Cement c'd nails, base per keg.....	2.30 to 2.55

CLEVELAND

Gain in Steel Business Is Small—Bars Weak —Pig Iron Prices Reduced

CLEVELAND, Sept. 9.—While demand for finished steel so far this month shows a gain over the corresponding period in August, the increase is only slight. Operations of plants in consuming industries have improved a little in spots. Some buyers are making purchases in larger lots than recently, but they are showing no interest in making commitments beyond early requirements. Improved demand is more noticeable in sheets than in other products.

The pickup in orders from the automotive industry is very moderate. There is little expectation that motor car manufacturers will make much gain in operations during the remainder of the year.

A local steel plant this week resumed the operation of four furnaces in its open-hearth department, which has been shut down for two weeks, and another producer put on one open-hearth, increasing local steel plant operation to 40 per cent of ingot capacity, a gain of 14 points. One or two Ohio sheet mills are operating somewhat better this week than last.

Pig Iron

A price reduction of 50c. a ton to \$17.50 has been made by Cleveland furnaces on foundry and malleable iron for local delivery. Recent shading on iron for outside shipment resulted in a wider differential between the local and outside price than usually exists and the reduction was made to narrow this differential. The new price is the lowest quoted locally since 1915, except for two months in the summer of 1928, when the market dropped to the same price. While \$17 is still the usual quotation for outside shipment, concessions to around \$16.50 are reported for delivery to competitive points. Other Lake furnace prices are unchanged at \$16.75 to \$17 for northern Ohio and \$17 for northern Indiana and \$18 for Michigan. Low phosphorus iron has been advanced 50c. a ton to a minimum of \$27, Valley furnace. A 500-ton lot brought that price during the week.

A turn upward seems to have come into the jobbing foundry industry, as several northern Ohio foundries report an improvement in orders during the week.

Prices per gross ton at Cleveland:		
N'th'n fdy., sil. 1.75 to 2.25		\$17.50
S'th'n fdy., sil. 1.75 to 2.25	\$18.51 to	19.51
Malleable		17.50
Ohio silvery, 8 per cent.		25.50
Basic Valley furnace		18.50
Stand. low phos., Valley		27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

Iron Ore

Receipts at Lake Erie ports during August amounted to 5,585,515 tons and for the season, 21,683,307 tons,

compared with 29,956,346 tons during the same period last year. August shipments from these docks were 3,725,382 tons and for the season, 16,186,011 tons, against 22,395,864 tons up to Sept. 1 last year. The dock balance Sept. 1 was 5,550,776 tons, against 5,110,516 tons on the same date last year.

Plates, Shapes and Bars

A slight improvement in bar tonnage is reported by some of the mills, and consumers are ordering in somewhat larger lots than recently. Plates and shapes are dull. Lake shipyards are figuring on work requiring 850 to 1000 tons of plates. Inquiry for fabricated work has subsided. Weak spots are reported in the local steel bar market, with concessions of \$1 a ton from the regular price of 1.65c., Cleveland, for outside shipment and 1.70c. for local delivery. Plates and shapes are generally quoted at 1.60c., Pittsburgh. Alloy steel bar prices appear to be firmly maintained.

Bolts and Nuts

Demand, while still slow from every consuming industry, shows a slight gain over that of August. Very little business is coming from jobbers. Regular discounts are being well maintained. The industry is operating at 45 per cent of capacity, or the same as in July and August.

Sheets

The market has a firmer tone as a result of announcements by additional independent mills that they will discontinue price shading and maintain as minimum prices recent ruling quotations, which have been quite commonly shaded \$2 a ton. The announced prices are being named for the fourth quarter as well as for current orders. These are 2.45c., Pittsburgh, for black, 2c. for light plates, 2.15c. for No. 13 blue annealed, 3.10c. for galvanized, 3.60c. for auto body and 3.70c. for metal furniture sheets. One producer making blue annealed sheets and light plates has advanced its prices on continuous mill products to conform with the jobbing mill

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.85c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.40c.
Cold-fin. flats and sq.	3.90c.
Hoops and bands, No. 12 to 14 in., inclusive	3.10c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.35c.
Blue ann'd sheets (No. 10)	3.10c.
No. 9 ann'd wire, per 100 lb.	\$2.50
No. 9 galv. wire, per 100 lb.	2.95
Com. wire nails, base per keg	2.40

*Net base, including boxing and cutting to length.

prices named above. On auto body sheets the 3.50c. price has not disappeared for current orders, but the 3.60c. price appears to have been restored for more extended delivery. Some mills that have taken contracts at 3.50c. will accept specifications against these contracts until Sept. 15. Volume of business showed a slight improvement the past week. Some small additional purchases were made by the local Fisher body plant for Chevrolet cars.

Strip Steel

The present ruling prices of 1.65c. Pittsburgh, for wide strip and 1.75c. for narrow have been named for the fourth quarter by some of the mills. Some of the large buyers have recently covered for wide strip at 1.60c. and will be allowed to specify against these contracts up to at least Sept. 15. One or two mills have named the present 2.35c., Cleveland and Pittsburgh, price for cold-rolled strip for the fourth quarter and a \$2 a ton higher price for less than car lots. On fender stock 3.60c. is being named for the fourth quarter. Recently the market was shaded from 3.70c., and this price now seems to have disappeared. Demand for both hot and cold-rolled material continues very slow, and mills have been unable to increase recent operations.

Old Material

With shipments still held up, there is no local demand. Valley district mills are taking a limited amount of material, and prices appear slightly easier in that district. Dealers are buying some scrap to fill outstanding orders in the Valley district, paying \$14.50 for heavy melting steel and \$14 for compressed sheet steel, or 50c. a ton less than the maximum a week ago.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$11.75 to \$12.25
No. 2 heavy melting steel	11.25 to 11.50
Compressed sheet steel	12.25 to 12.50
Light bundled sheet	
stampings	11.00 to 11.50
Drop forge flashings	10.00 to 10.50
Machine shop turnings	8.00 to 8.50
Short shoveling turnings	9.75 to 10.25
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	11.75 to 12.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.00 to 9.25
Mixed borings and short turnings	9.00 to 9.25
No. 2 busheling	8.75 to 9.00
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Rails for rolling	16.25 to 16.50
Railroad malleable	16.00 to 16.50

NEW YORK

Reading Buys 30,000 Tons of Rails—Steel Orders Gain Slightly

NEW YORK, Sept. 9.—Pig iron sales, at 6500 tons, compare with 7500 tons in the previous week and 8500 tons two weeks ago. The volume of business shows little change from week to week, variations being accounted for mainly by the presence or absence of one or two large individual sales. Definite signs of increased melt are still lacking and the general trend in pig iron production is toward further curtailment. A Buffalo furnace is scheduled to go out within the next few days. Furnace stocks at various producing centers are apparently showing no further expansion, but the fact remains that they are large and are not being reduced.

Prices in this section are unchanged, Buffalo foundry iron selling at \$16, furnace, with silicon differentials commonly waived. Delivered prices on eastern Pennsylvania iron are usually on a competitive basis, while quotations on Alabama foundry figure back to \$12 or \$12.50, Birmingham, depending on the tonnage and the mode of water shipment. Some melters with large tonnages to buy are sounding out the Southern producers in an effort to obtain a lower price than \$12.

Chicago producers are understood to be offering foundry iron for delivery in the Buffalo district at a concession from the prices quoted by Buffalo furnaces. A water shipment of iron from Chicago would be turning the tables on Buffalo producers, who have been liberal shippers to Lake Michigan ports in recent years.

The American Locomotive Co. is in the market for 100 tons of No. 3 foundry for Schenectady, N. Y. Aside from inquiries for 500 tons and 700 to 1000 tons which are still pending, the market is singularly free from sizable formal requests for prices. However, considerable spot business is developing, usually as the result of solicitation. The Worthington Pump & Machinery Corporation has closed for 500 tons of foundry iron for its Buffalo plant.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	
*Buff. No. 2, del'd east.		\$20.91
N. J.		19.28
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	\$18.89 to 19.39
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.

Public undertakings feature pending business in concrete bars. A storm sewer in Brooklyn will require 1000 tons, low bidders have been announced

on work in connection with the Passaic River bridge and the New Jersey approaches to the Fort Lee bridge, and two sizable subway sections will come up for revised tenders this month. Lettings are of average proportions. A leading seller is expected to advance quotations during the week, but meanwhile warehouse prices on concrete bars range from 2.30c. to 2.50c. a lb., f.o.b. cars, New York, while 40, 50 and 60-ft. lengths for mill shipment are quoted by distributors at 1.75c. to 1.85c. a lb., Pittsburgh.

Finished Steel

A moderate improvement in miscellaneous orders for steel has characterized business the past week. Some sales offices do not see so much gain in aggregate tonnage booked as in the number of orders, indicating that a good many consumers who have not been buying recently are coming into the market. Nearly all tonnages are small. A better tone is in evidence, however, chiefly because of the fact that quite a few steel buyers have indicated that their orders probably will gain in the near future. Expectations of steel sellers, however, are conservative, it being a quite general belief that there will be no broad recovery this fall, but rather a steady, though

small increase, from month to month.

Railroad buying, though small, has shown some signs of life. The Reading has placed 30,000 tons of 130-lb. rails, dividing the tonnage equally between the Carnegie and Bethlehem companies, while the Lehigh & New England has ordered 300 all-steel box cars, five cabooses and 11 locomotives. The Lackawanna has ordered 2500 tons of rails from Bethlehem. The New York Central Lines are expected to come into the market within a week or 10 days for their 1931 rail requirements, probably about 150,000 tons. A new shipbuilding contract is for a \$7,000,000 ship for the Matson Line, awarded to the Fore River plant of the Bethlehem Shipbuilding Corporation.

Some of the improvement in steel orders in the past week is attributed to the firmer stand on prices taken by sheet mills. Many of the mills gave their customers an opportunity to get under cover at substantial concessions from the newly announced minimum prices, and the result is that most buyers have covered their requirements for the immediate future and some into the fourth quarter; hence a real test of the present minimum schedule has been postponed. Galvanized sheets were sold at less than 3c., Pittsburgh, and only slightly lesser concessions developed in black and blue annealed sheet sales.

Announcement of a minimum price of 1.65c., Pittsburgh, on bars has been made by at least one large producer. On plates and shapes, it appears that 1.60c. may extend through the final quarter, some contracts in plates having been made at that figure. A part of the more confident feeling prevailing in the steel trade is due to the belief that price concessions are virtually at an end, though it is admitted it may be difficult to obtain higher quotations during the remainder of the year.

Warehouse Business

The usual improvement in buying that develops in September has begun, but the increase in tonnage over August is still rather small. Demand for galvanized sheets continues fair, but prices lack strength. Shading on black and blue annealed sheets is common, with concessions ranging up to \$3 and \$4 a ton. Orders for structural material are individually larger than during the past few months.

Cast Iron Pipe

Operating rates of Northern foundries continue at 70 to 75 per cent and on certain sizes makers are running full. New business, however, is small, most of the current buying be-

(Concluded on page 740)

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars, small shapes.....	3.10c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter	
hard.....	4.95c.
Hoops.....	3.75c.
Bands.....	3.40c.
Blue ann'd sheets (No. 10).....	3.25c. to 3.40c.
Black sheets (No. 24*).....	3.65c. to 3.90c.
Galvanized sheets (No. 24*).....	4.25c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1/2 x 1/2 in. and larger.....	3.40c.
Smooth finish, 1 to 2 1/2 x 1/4 in.	
and larger.....	3.75c.
Open-hearth spring steel, bases,	
higher per 100 lb.....	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent	Off List
Machine bolts, cut thread:		
1/2 x 6 in. and smaller.....	65	
1 x 30 in. and smaller.....	65	
Carriage bolts, cut thread:		
1/2 x 6 in. and smaller.....	65	
3/4 x 20 in. and smaller.....	65	
Boller Tubes:		Per 100 Ft.
Lap welded, 2-in.....		\$19.00
Seamless steel, 2-in.....		20.25
Charcoal iron, 2-in.....		26.25
Charcoal iron, 4-in.....		67.00

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box...	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

PHILADELPHIA

Steel Consumers More Active—Mill Operations Unchanged

PHILADELPHIA, Sept. 9.—With steel consumers operating at better rates and inquiry showing some improvement, sentiment is decidedly better, although the volume of business being received continues small. Mills are seeking to maintain steel prices, eliminating the concessions so common in recent months, but on most products there are no substantial tonnages in the market to test the firmness of the mill position.

Eastern Pennsylvania operating rates continue at about 50 per cent of capacity in the rolling mills and considerably lower in output of ingots. Improved consumer operations, however, promise some increase in business. Manufacturers of hardware specialties report more orders than for some months, and radio manufacturers, although still far below the production schedules planned for this year, have made considerable increases in output since the first of the month.

The Reading Railroad has divided 30,000 tons of rails between the Bethlehem Steel Co. and the Carnegie Steel Co.

Pig Iron

Foundries producing small hardware products are beginning to increase their operations and are inquiring for pig iron for prompt delivery. With stocks on consumers' yards generally small, a substantial number of present inquiries are for immediate delivery of small tonnages. While \$18.50 a ton, furnace, is generally quoted on small lots by eastern Pennsylvania producers, competition from Southern makers brings out occasional concessions to \$18, furnace, when desirable business is offered. Among recent inquiries for foundry iron are 125 tons of Nos. 2 and 1X for the Delaware, Lackawanna & Western Railroad and a carload of No. 2 foundry for the Newport News Shipbuilding & Dry Dock Co. The Panama Canal Commission has opened bids on a carload of No. 2 foundry.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$19.26 to \$19.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.76 to 20.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	20.26 to 20.76
Basic (del'd east. Pa.)	18.25 to 21.25
Malleable	
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Steel Bars

Mild steel bar prices continue at 1.60c. a lb., Pittsburgh, or 1.89c. de-

livered Philadelphia. Most of the current buying is of less than carload lots. Bids are being submitted on some substantial tonnages of reinforcing bars. The quotations on billet steel bars are unchanged at 1.75c. to 1.85c. a lb., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia, and rail steel bar prices range from 1.55c. to 1.65c., Franklin, Pa., or 1.84c. to 1.94c., delivered Philadelphia.

Shapes

Mills are endeavoring to adhere more firmly than in recent weeks to a minimum quotation on shapes of 1.60c. a lb., f.o.b. nearest mill to consumer, or 1.66c., delivered Philadelphia, with small tonnages quoted at 1.65c., f.o.b. mill, or 1.71c., Philadelphia. The tonnage of new business being booked by mills shows no increase, and operating rates continue at about 50 per cent of capacity in most cases. Fabricators in this district are bidding on some sizable contracts, including a building for tubercular patients at the Philadelphia General Hospital, requiring about 1000 tons.

Plates

Inquiry for plates is better, but the actual tonnage being placed on mill books each week has not materially increased. The price of 1.70c., Coatesville, Pa., or 1.80½c., delivered Philadelphia is generally maintained on new business, but some outstanding quotations at slight concessions from this price have not been withdrawn.

Sheets

Local consumers of sheets are showing increased activity, especially radio manufacturers, which have increased their daily output consider-

ably since Sept. 1, and have been actively buying small lots of electrical and deep-drawing sheets. Blue annealed sheet and plate capacity in this district will be increased by Oct. 1, when a Claymont, Del., plate mill begins to roll Nos. 10 to 16 gage up to 48 in. wide. Sheet prices are being maintained on current small tonnage buying. Blue annealed sheets, No. 13 gage, are quoted at 2.15c. a lb., Pittsburgh, or 2.44c., delivered Philadelphia, and blue annealed plates, No. 10 gage, at 2c., Pittsburgh, or 2.29c., delivered Philadelphia. Black sheets are 2.45c., Pittsburgh, or 2.74c., Philadelphia, and galvanized sheets 3.10c., Pittsburgh, or 3.39c., Philadelphia.

Imports

In the week ended Sept. 6, arrivals at this port consisted of 3089 tons of chrome ore from Cuba and 720 tons from Greece, 6650 tons of iron ore from Algeria and 43 tons of hollow drill steel from Sweden.

Old Material

Most grades of scrap are inactive, but the trend of prices is toward greater strength. A sizable tonnage of No. 2 heavy melting steel has been bought in eastern Pennsylvania at \$11 a ton, delivered. No. 1 heavy melting steel is inactive, but the price appears firm at \$13, with brokers paying \$12.50 to complete contracts. A Florence, N. J., consumer of heavy breakable cast is offering up to \$12.50 delivered, for strictly first grade material. Other grades are unchanged in price, with demand small.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel..	\$13.00
No. 2 heavy melting steel..	\$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought...	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.75 to 9.00
Heavy breakable cast (for steel works)	11.50 to 12.50
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos., hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Roller steel wheels	17.50 to 18.00
No. 1 blast furnace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	21.00 to 21.50
No. 1 forge fire	11.50 to 12.00
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to ¼-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, ¼-in.	5.30c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

ST. LOUIS Steel Operations Up Slightly—Tin Plate Most Active Item—Pig Iron Dull

ST. LOUIS, Sept. 9.—Buying of pig iron in this district from both Northern and Southern makers continues at low ebb, and factors here see no prospect of improvement during the remainder of the third quarter. The price situation is fairly steady, with an occasional report of shading. The melt in the district is light. Malleable foundries, however, report an improvement as a result of buying by the automobile interests. The drought is reported to have affected the sale of stoves in the agricultural sections.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$18.00 to \$18.50
Malleable, f.o.b. Granite City	18.00 to 18.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	16.42 to 16.92
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd	19.16 to 19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel

An improvement in operations of the Granite City Steel Co. over the first part of August is reported, output being at about 57 per cent of capacity. The greatest improvement has been in the tin plate department. Warehouse business for August was better than the preceding month, and the early part of September also showed an improvement over the same period in August. Inquiries for plates, shapes, bars and sheets are improving.

Structural fabricators, finding business here dull, are going after outside jobs, the Mississippi Valley Structural Steel Co. having been awarded 1000 tons for small buildings for the Texas-Chicago pipe line and 1075 tons for a post office at Wichita, Kan. The Missouri Rolling Mills Corporation got the order for

350 tons of reinforcing bars for a viaduct here, and 160 tons for a garage at Jefferson City went to the Laclede Steel Co.

Old Material

The scrap market continues quiet. There is no buying whatever of either blast furnace or rolling mill grades, and but little of steel mill grades, buyers of which are looking for bargains. There is said to be very little distress material, and stocks in hands of dealers are very low. Railroad offerings are light, and competition for lists is keen. Miscellaneous standard-section rails are scarce, and dealers are paying 50c. more than last week for this item. Machine shop turnings are off \$1 because there is no demand for them. The only railroad list of the week was that of the Baltimore & Ohio, 8957 tons.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel	11.00 to 11.50
No. 2 heavy melting or shoveling steel	10.00 to 10.25
No. 1 locomotive tires	13.00 to 13.50
Misc. stand-sec. rails including frogs, switches and guards, cut apart	12.50 to 13.00
Railroad springs	14.00 to 14.50
Bundled sheets	6.50 to 7.00
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	8.00 to 8.50
Cast iron borings and shoveling turnings	6.00 to 6.50
Iron rails	10.00 to 11.00
Rails for rolling	12.75 to 13.25
Machine shop turnings	5.00 to 5.50
Heavy turnings	9.25 to 9.75
Steel car axles	16.00 to 16.50
Iron car axles	21.50 to 22.00
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	14.00 to 14.50
Steel angle bars	11.75 to 12.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	11.00 to 11.50
Railroad malleable	10.50 to 11.00
No. 1 railroad cast	11.00 to 11.50
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricult. malleable	10.00 to 10.50

BIRMINGHAM Steel Operations Higher at Ensley—Prices Revised

BIRMINGHAM, Sept. 9.—The pig iron market is still overcast by dullness, with sales in small lots for immediate delivery. No inquiries are being issued, and furnace interests are limiting quotations to September deliveries, which take the base price of \$14, Birmingham. Shipments declined last week. The combination rail and barge rates that have been in effect for more than a year to Atlantic Coast points have been extended for another period of six months. The total of active furnaces continues at 13. Of this number, eight are on foundry iron, four on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$14.00
No. 1 fdy., 2.25 to 2.75 sil.	14.50
Basic	14.00

Finished Steel

Sales thus far in September have been slightly above the August average, and the market has a little better tone. The market usually swings into the fall buying season during September, but mill officials hazard no predictions as to the extent of the improvement this time. Wire products demand is responding slowly to the fall buying season. Jobbers are not buying ahead, but are awaiting their cue from consumers, especially in the lines that reach the farm market. Rail demand is lacking, but operations continue on old orders, some of which are for export.

Box annealed sheets have been reduced \$1 a ton and are now quoted at 2.65c. to 2.70c. The price range on bars, plates and shapes has been dropped and quotations now carry

only the recent minimum figure of 1.85c.

The Tennessee company has increased its active open-hearths at Ensley from four to six. Four are active at Fairfield, and the Gulf States Steel Co. continues to work three at Alabama City.

Fabricated structural steel demand shows improvement. The Virginia Bridge & Iron Co. has booked 500 tons for a State highway bridge in Roane County, Tenn. The New Orleans Board of Port Commissioners opens bids Sept. 11 on 1850 tons for two wharves. Small orders and inquiries for reinforcing bars are holding up fairly well, but the market shows no promise of any particular increase.

Cast Iron Pipe

Pending tonnage shows improvement as makers continue to cut down stocks through rush shipments on municipal jobs. New projects are quicker to reach the market, but there is still a tendency to hold up on them after bids have been opened. Contracts are still pending on 200 tons for Greenville, Ala., and a larger tonnage at Spartanburg, S. C. Bids were opened Sept. 5 on 600 tons for Wycena, Wis., and 300 tons for Livingston, Tenn. Contracts are pending on bids recently opened for 2000 tons for the Southern California Water Works Service, San Francisco. Detroit will open bids Sept. 12 on 3000 tons, and Johnson City, Tenn., will take bids Sept. 11 on 300 tons. Morgan City, La., will take bids on the same date for 150 tons. Lebanon, Tenn., plans six miles of new cast iron mains, and Lawton, Okla., is ex-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

pected to be in the market soon for a large tonnage. The National Cast Iron Pipe Co. is low bidder on 800 tons for Lake Falls, Mont. Prices remain at \$37 and \$38 a ton, Birmingham.

Coke

Foundry coke demand is recovering some, following two of the dullest months in years. Prices are unchanged, the base being \$5 a ton net, Birmingham.

Old Material

Sales are confined to small spot tonnages and these are scattered. Large

steel mills, the only important users at present, still have considerable scrap due them on old contracts. Buying is too light to bring adjustment in the price schedule.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings..	9.00
Cast iron borings.....	9.00
Stove plate.....	11.50 to 12.00
Steel axles.....	20.00
Iron axles.....	23.00
No. 1 railroad wrought... 10.00 to	10.50
Rails for rolling.....	14.50
No. 1 cast.....	13.00
Tramcar wheels.....	12.50
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem...	13.50 to 14.00

BUFFALO Operations of Steel Plants and Blast Furnaces Tend Downward

BUFFALO, Sept. 9.—Another stack has been taken out of blast at the Lackawanna plant of the Bethlehem Steel Corporation and the stack of the Tonawanda Iron Corporation is due to go down within a few days. These shutdowns will reduce the active blast furnaces in this district to six. Business reported by Buffalo furnaces during the past week was less than 5000 tons. An encouraging feature is an increase in the melt. This has not resolved itself into sizable inquiry, although there is some tonnage in sight on which quotations have not yet been asked. The Worthington Pump & Machinery Corporation is understood to have closed for the major portion of its immediate requirements. Shipments are reported slightly better so far in September than during the like period in August. Two of the sellers in this territory are adhering to full differentials on Eastern business and all of them are firm on district business.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$18.50
No. 2X fdy., sil. 2.25 to 2.75.....	19.00
No. 1 fdy., sil. 2.75 to 3.25.....	20.00
Malleable, sil. up to 2.25.....	19.00
Basic.....	17.50
Lake Superior charcoal.....	27.28

Finished Steel

The mill situation, so far as operation is concerned, is not quite so good as it was last week. The Lackawanna plant of the Bethlehem Steel

Corporation is operating 11 open-hearth furnaces of 24. The Donner branch of the Republic Steel Corporation is operating four of nine and the Wickwire-Spencer Steel Corporation is operating three or four. Reinforcing bars for the Bailey Avenue market terminal were let to a local maker. The job involved 700 tons. Lettings of road work at Albany Sept. 4 required 250,000 yd. of reinforced road mesh, considerable of which came to local makers. Structural business is very quiet.

Old Material

With the slowing up of mill and blast furnace operation, the immedi-

ate outlook is not for heavy buying of scrap. Dealers report only a few transactions of an inconsequential character. Stocks in dealers' yards are not heavy and operations in yards are at a minimum.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:

No. 1 heavy melting steel..	\$12.75 to \$13.25
No. 2 heavy melting scrap..	11.00 to 12.00
Scrap rails.....	12.00 to 12.50
Hydraulic comp. sheets....	11.25 to 12.25
Hand bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	11.00 to 11.50
No. 1 busheling.....	11.25 to 12.50
Hvy. steel axle turnings..	11.00 to 11.50
Machine shop turnings....	6.00 to 7.00
No. 1 railroad wrought... 10.00 to	10.50

Acid Open-Hearth Grades:

Knuckles and couplers....	15.00 to 15.50
Coil and leaf springs.....	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends	16.50 to 17.00

Electric Furnace Grades:

Short shov. steel turnings..	9.75 to 10.25
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Blast Furnace Grades:

Short mixed borings and turnings	7.50 to 8.00
Cast iron borings.....	7.50 to 8.00
No. 2 busheling.....	7.00

Rolling Mill Grades:

Steel car axles.....	16.00 to 16.50
Iron axles.....	19.00 to 19.50

Cupola Grades:

No. 1 machinery cast.....	11.00 to 12.00
Stove plate.....	10.25 to 10.50
Locomotive grate bars....	8.25 to 9.25
Steel rails, 3 ft. and under	16.00 to 16.50
Cast iron carwheels.....	13.50 to 14.00

Malleable Grades:

Industrial.....	14.25 to 15.25
Railroad.....	14.25 to 15.25
Agricultural.....	14.25 to 15.25

Special Grades:

Chemical borings.....	11.50 to 12.00
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YOUNGSTOWN Plates and Bars May Be Advanced \$1 a Ton

YOUNGSTOWN, Sept. 8.—The first week of the new month brought no concrete encouragement to steel mills in the Valleys, but the market undoubtedly has a stronger sentimental tone. Higher asking prices on flat-rolled steel products have encouraged mills and stimulated an interest among steel consumers, which mills believe will certainly be translated into some improvement in tonnage booked before the end of the month.

As usual, preferred buyers have been allowed to place orders for limited tonnages at former prices, but producers have attempted to limit the time for releases on such material. In only exceptional cases have contracts been extended over the remainder of the year, and sheet and strip makers in this district are generally naming quotations announced last week by an important independent producer on fourth quarter business. These figures are 2.45c., Pittsburgh, on black sheets, 3.10c. on galvanized, 2c. on light plates, 2.15c. on blue annealed sheets, and 3.60c. on automo-

bile body sheets. On continuous mill light plates and blue annealed sheets, the usual \$4 differential under the jobbing mill product will prevail. Hot-rolled strips are quoted at 1.65c., Pittsburgh, for material from 6 to 24 in. wide, and 1.75c. for the narrower sizes. On cold-rolled strip smaller consumers will be asked to pay 2.45c., Pittsburgh, while 2.35c. may be available to preferred customers.

Although fourth quarter prices on bars and plates have not been officially named, mills are expected to quote 1.65c., Pittsburgh, an advance of \$1 a ton over the price prevailing on considerable recent business. No change is contemplated on wire products, with manufacturers' wire standing at 2.30c., Pittsburgh, and nails at \$2.05 to \$2.15 per keg. Semi-finished steel is also expected to be nominally quoted at \$31, Pittsburgh or Youngstown.

Operations

Steel ingot operations in the Valleys are slightly over 50 per cent of capacity, with pipe mill requirements

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Soft steel bars.....	3.15c.
Reinforcing bars.....	2.95c.
Cold-fin. flats and sq.....	3.65c.
Rounds and hex.....	3.15c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.60c.
Bands.....	3.50c.
Hoops.....	3.90c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.20
Black wire, base per 100 lb.....	3.50

readily maintaining this figure. Lap-weld and seamless units are engaged at a 75 per cent rate, while the electric weld mill of the Republic company is well engaged. This company expects to place its third electric weld unit in operation next month, while the Youngstown Sheet & Tube Co. plans to begin commercial production in its new electric weld mill about Oct. 1. Sheet mills are scheduled at 45 to 50 per cent, although heavier automotive releases this month have stimulated production in some plants. Generally speaking, full finishing mills have been running at a lower rate than units producing the common finishes of sheets, and the low volume of automobile orders does not justify expectation of any sustained change. Bar mill schedules are also under 50 per cent, and strip production remains at 45 to 50 per cent of capacity.

Pig Iron and Scrap

Pig iron production was curtailed further last week with the blowing out of the Trumbull Cliffs stack of the Republic Steel Corporation, which will be relined and enlarged. Iron for the Warren furnaces of the Republic company will be supplied from Youngstown. The merchant pig iron market is very dull, but an inquiry from a Valley consumer for 1000 tons of basic iron has occasioned considerable interest. It is admitted that steel companies in the district are willing to shade the nominal price of \$18, Valley, for basic iron to take this order. The scrap market is quiet, but prices are well sustained at \$15 to \$15.50 for heavy melting steel and \$14.75 to \$15.25 on hydraulic compressed sheets.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees	3.365c.
Zees	3.365c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined.....	4.60c.
Norway rounds	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	3.50c. to 5.55c.
Squares and flats.....	4.00c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts .....	.60 and 5
Carriage bolts .....	.60 and 5
Lag screws .....	.60 and 5
Hot-pressed nuts .....	.60 and 5
Cold-punched nuts.....	.60 and 5
Stove bolts .....	.70 and 10

BOSTON Gain in Pig Iron Demand Awaits Improvement in Machinery Business

BOSTON, Sept. 9.—Pig iron sales the past week did not exceed 1500 tons, all in car lots, mostly for prompt shipment. New England textile machinery and machine tool builders, the largest pig iron consumers, are melting little iron, and until business with them improves not much life is expected by furnace representatives. No. IX Buffalo iron now is quoted at \$16.50 a ton, on cars, furnace, against \$16 a week or 10 days ago. No. 2 plain and No. 2X grades are still obtainable at \$16, with furnaces east of Buffalo meeting that price.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25..	\$20.28
†Buffalo, sil. 2.25 to 2.75..	\$20.28 to 20.78
*Buffalo, sil. 1.75 to 2.25..	20.91
*Buffalo, sil. 2.25 to 2.75..	20.91 to 21.41
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
*Ala., sil. 1.75 to 2.25.....	22.61
*Ala., sil. 2.25 to 2.75.....	23.11
†Ala., sil. 1.75 to 2.25.....	18.75
†Ala., sil. 2.25 to 2.75.....	19.25

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Cast Iron Pipe

The Providence Gas Co., Providence, R. I., has placed 375 tons of pipe with the United States Cast Iron Pipe Co.; Stoughton, Mass., 345 tons of 6 and 8-in. with R. D. Wood & Co.; Newton, Mass., 130 tons of 6 and 8-in., Ipswich, Mass., 100 tons of 6-in. and Salem, Mass., 100 tons with the Donaldson Iron Co. Business otherwise has been confined to scattered car lots. Prices range from \$35 to \$37 a ton, on cars shipping point, for 6 in. and larger dimensions. Indications are the Warren Foundry & Pipe Co. will start operations at its new Everett, Mass., foundry on or about Sept. 22.

Reinforcing Bars

Less than 1000 tons of reinforcing bars were sold the past week. Included in the sales were 250 tons and 100 tons of rail steel bars for road work, and numerous smaller tonnages, such as 70 tons for a Harvard College dormitory at Cambridge, Mass., 65 tons for a Malden, Mass., hospital and 50 tons for an Everett, Mass., hospital. Billet steel bar prices are: One to 5 ton lots, 3.15c. a lb., base, from stock; 6 to 99 ton lots, 2.65c.; 100 ton lots and larger, 2.55c. Rail steel bars are 2.26½c. a lb., base, delivered Boston freight rate points.

Structural Steel

Lettings of steel in round tonnages were a little more than 1000 tons the past week, mostly for bridge work. H. K. Ferguson Co., Boston, is asking bids on 2000 tons for the Professional Arts Building here, and within a month will probably take bids on

18,000 tons for the New England Building, which will be one of the largest buildings in the country.

Warehouse Business

Wire nail prices have been reduced 5c. a keg. Current quotations on mill shipments in car lots are \$2.10 a keg, base Pittsburgh, and less than carload lots \$2.35. From warehouse the price is \$3 a keg, base. Largely because of small consumer and iron worker buying, the movement of bars, flats and angles from warehouses is increasing. Estimates are that September deliveries will run about 20 to 30 per cent ahead of those of August.

Old Material

The only change in the old material situation is an improvement in sentiment due to a belief that prices will be higher before the end of this month. Purchases of material in the aggregate are small and prices are unchanged. One local house is still buying textile and No. 1 machinery cast for Pittsburgh district consumption against an old order.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$9.25 to \$9.55
Scrap T rails.....	8.60 to 9.00
Scrap girder rails.....	7.60 to 7.75
No. 1 railroad wrought...	7.00 to 7.50
Machine shop turnings....	4.10 to 4.35
Cast iron borings (steel works and rolling mill)	4.10 to 4.35
Bundled skeleton, long....	6.10 to 6.50
Forge flashings.....	7.25 to 7.75
Blast furnace borings and turnings	3.10 to 3.60
Forge scrap.....	6.10 to 6.50
Shafting	13.50 to 14.50
Steel car axles.....	16.50 to 17.50
Wrought pipe, 1 in. in diameter (over 2 ft. long)	7.00 to 7.60
Rails for rolling.....	9.00 to 9.25
Cast iron borings, chemical	9.10 to 9.60

Prices per gross ton deliv'd consumers' yards:

Textile cast.....	\$11.50 to \$12.00
No. 1 machinery cast.....	13.00 to 14.00
No. 2 machinery cast.....	11.00 to 11.50
Stove plate.....	8.50 to 9.50
Railroad malleable.....	16.00 to 16.25

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	4.20c.
Small rivets .....	.60 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in..	\$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in....	17.50
4-in.	36.00

CINCINNATI Pig Iron Sales Gain Sharply—Sheet Bookings Under 50 Per Cent of Capacity

CINCINNATI, Sept. 9.—Demand for pig iron in this district has increased sharply, furnace representatives reporting total sales for the week of about 4700 tons. The melt on the average has improved slightly, but foundries have not reached a good operation yet. Two Southern Ohio consumers entered the market for 1900 tons and 200 tons of Northern foundry iron respectively, and a central Ohio buyer took 500 tons. Prices on these sales figure back to about \$16 to \$17, base Lake furnace.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$20.89 to \$21.39
Ala. fdy., sil. 1.75 to 2.25 15.69 to 16.69
Ala. fdy., sil. 2.25 to 2.75 16.19 to 17.19
Tenn. fdy., sil. 1.75 to 2.25 15.69 to 16.69
S'th'n Ohio silvery, 8 per cent 24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Steel

Demand for sheets in this district continues at less than 50 per cent of capacity. All lines of sheet consumption are represented in current bookings, but orders are for small quantities and usually call for immediate shipment.

Old Material

The scrap market is quiet. Because of weakness in the cast iron grades, dealers are bidding less on these grades than a week ago, and a general revision of the prices has been made, ranging from 25c. to \$3. The Southern Railway has published a small list, bids on which close this week.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$11.25 to \$11.75
Scrap rails for melting.....	12.00 to 12.50
Loose sheet clippings.....	7.75 to 8.25
Bundled sheets.....	9.75 to 10.25
Cast iron borings.....	6.75 to 7.25
Machine shop turnings.....	6.25 to 6.75
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.25 to 13.75
No. 2 railroad wrought.....	11.25 to 11.75
Short rails.....	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	12.50 to 13.00
Burnt cast.....	7.25 to 7.75
Stove plate.....	7.25 to 7.75
Brake shoes.....	7.25 to 7.75
Agricultural malleable.....	12.50 to 13.00
Railroad malleable.....	13.50 to 14.00

PACIFIC COAST

SAN FRANCISCO, Sept. 6.—(By Air Mail.)—A slight improvement in demand is noted. Steel producers seem less inclined to shade current prices. Reinforcing bars and structural shapes were the most active items. Important lettings included 1000 tons of reinforcing bars for a plant in Seattle for the American Can Co., booked by the Pacific Coast Steel Corporation, and 575 tons of structural shapes for an auditorium at Claremont, Cal., secured by the Pacific Iron & Steel Co.

Steel Bars

Reinforcing steel bar awards totaled 2100 tons. The Northwest Steel Rolling Mills took 350 tons for the Larson Building, Yakima, Wash., and 100 tons for a garage addition on Second Avenue, Seattle. The Pacific Coast Steel Corporation was awarded 307 tons for Hale Brothers store at San Jose, Cal. An unnamed interest took 200 tons for an auditorium at Claremont, Cal. Out-of-stock prices in the San Francisco district remain unchanged at 2.50c., base, on carload lots. Mild steel bars continue to move in relatively small lots. On this class of material 2.35c., c.i.f. appears firm.

Plates

Bids were opened this week on 2000

Pig iron prices per gross ton at San Francisco:

*Utah basic.....	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25.....	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25.....	22.00 to 24.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Slight Improvement in Demand Occurs—Less Shading of Steel

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, 1/2-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c't'd nails, 100 lb. keg.....	3.35

tons of plates for a pipe line at Anacortes, Wash. Seattle has authorized the call for bids for a 10,000-ton pipe line involving 48-in. pipe. The Commercial Boiler Works secured 450 tons for a surge tank for the Diablo power plant at Seattle, and the Puget Sound Machinery Depot took about 100 tons for boilers for the White River Lumber Co. at Enumclaw, Wash. Prices continue to range from 2.15c. to 2.25c., c.i.f.

Structural Shapes

Dyer Brothers booked 400 tons for a plant at Pittsburg, Cal., for the Stockton Firebrick Co. and the Kansas City Structural Steel Co. secured 350 tons for a smelter stack at Douglas, Ariz., for the Calumet & Arizona Mining Co. Included among the new inquiries are 300 tons for the Fox Theater, Spokane, Wash., and 205 tons for a bridge for the Arizona Highway Commission. All bids on the State Building, Los Angeles, involving 1800 tons, were rejected and new bids will be opened on Sept. 30. Shapes range from 2.15c. to 2.25c., c.i.f.

Cast Iron Pipe

The Pacific States Cast Iron Pipe Co. secured the largest award of the

week, involving 338 tons of 2-in. centrifugal pipe for Los Angeles. The American Cast Iron Pipe Co. took 100 tons of 16-in. Class C pipe for the Indian School, Tacoma. Bids were opened on 189 tons of 2 to 8-in. Class C pipe for San Diego. Seattle is taking bids on 188 tons of 16-in. Class B pipe. Bids will be opened on Sept. 11 for 1577 tons of 8 to 12-in. Class B to 250 pipe for Los Angeles. Oakland, Cal., will open bids on Sept. 24 for 2022 tons of 4 to 8-in. Classes B, 150 and 250 pipe.

CANADA

Pig Iron Sales Gain Slightly—Building Construction Expanding

TORONTO, Sept. 9.—Merchant pig iron sales showed a slight gain over those of the week before. Inquiries, however, continue light and the majority specify small lots. Small repeat orders, however, are appearing at frequent intervals and weekly sales are running into better volume. Producers have opened their books for last quarter contracts, but so far interest has been confined to inquiries. Local blast furnace representatives do not look for large tonnage commitments.

Prices per gross ton:

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable.....	22.60
	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable.....	24.00
Basic.....	22.50

Structural Steel

The demand for building steel is steadily expanding. The betterment is largely due to enlarged building programs by municipal, provincial and federal governments. The bulk of new business continues to be in connection with bridge construction projects.

Old Material

New business is in smaller volume than in most other lines of industry. Consumers are placing orders only when urgently in need of supplies, and then orders are for small tonnages. Mills are taking large tonnages of heavy melting steel, rails, etc., from the railroads, but are placing only odd car lots with the dealers.

Dealers' buying prices for old material:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.....	\$9.00	\$8.00	
Rails, scrap.....	10.00	8.00	
No. 1 wrought.....	9.00	11.00	
Machine shop turnings.....	6.00	5.00	
Boiler plate.....	7.00	6.50	
Heavy axle turnings.....	7.00	6.00	
Cast borings.....	6.50	5.00	
Steel borings.....	6.50	6.00	
Wrought pipe.....	4.00	4.00	
Steel axles.....	10.00	13.00	
Axles, wrought iron.....	12.00	15.00	
No. 1 machinery cast.....	12.00	12.00	
Stove plate.....	10.00	10.00	
Standard carwheels.....	10.00	10.50	
Malleable.....	10.00	10.00	
	Per Net Ton		
No. 1 mach'ry cast.....	11.00	....
Stove plate.....	9.00	....
Standard carwheels.....	10.00	....
Malleable scrap.....	9.00	....

▲▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲▲

Mill Prices of Semi-Finished Steel

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

Sheet Bars (Open Hearth or Bessemer)	
	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Slabs (8 in. x 2 in. and under 10 in. x 10 in.)	
	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

Skelp (F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.70c
Universal	1.70c
Sheared	1.70c

Wire Rods (Common soft, base)	
	Per Gross Ton
Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	11c.
Iron ore, basic Swedish, average 65% iron	9c.
Manganese ore, washed 52% manganese, from the Caucasus	26c. to 28c.
Manganese ore, Brazilian, African or Indian, basic 50%	26c. to 28c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$14.00
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	
Molybdenum ore, 85% concentrates of MoS ₂ delivered	50c. to 55c.

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.65
Foundry, f.o.b. Connellsville prompt	\$3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.35
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, 1/4-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.80 to .90
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard	\$94.00 to \$99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$33.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
Per Gross Ton Furnace	
10%	\$35.00
11%	37.00
12%	39.00
14%	39.00
16%	39.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$26.50
11%	28.50
12%	30.50
13%	32.50
14%	34.50
15%	37.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$21.50
7%	22.00
8%	22.50
9%	23.50
10%	24.50
11%	26.50
12%	28.50
13%	30.50
14%	32.50
15%	35.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal del'd	\$1.30 to \$1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick	
Per 1000 f.o.b. Works	
High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagon nuts	73
Semi-finished hexagon castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh.	80, 10, 10 and 5
Stove bolts in packages, Chicago	80, 10, 10 and 5
Stove bolts in packages, Cleveland	80, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago	80, 10, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2 1/2
Fire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets (1/2-in. and larger)	
	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$2.75
F.o.b. Chicago	2.85

Small Rivets (1/8-in. and smaller)	
	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Fabricated Structural Steel

Awards Reach Fair Total At 34,000 Tons, But New Projects Are Only 12,000 Tons

FABRICATED steel awards totaling about 34,000 tons exceeded the previous week's total and represented an average week's business for this year. Included were 4000 tons for an office building at Fifty-third Street and Madison Avenue, New York, 2380 tons for an apartment building on Central Park West, New York, 1700 tons for an art museum in Toledo, Ohio, and 1700 tons in the north approach to the outer drive bridge, Chicago.

New projects made one of the smallest totals of the year, with only about 12,000 tons, of which 5000 tons was a subway section in Brooklyn. The only other new projects of size were wharfs in New Orleans, 1850 tons, a State building in Los Angeles, 1800 tons, and a building for the Philadelphia General Hospital, 1000 tons. Awards follow:

North Atlantic States

STATE OF MASSACHUSETTS, 400 tons, highway bridges between Boston and Worcester, to Bethlehem Steel Co.
FRANKLIN, N. H., 270 tons, State bridge, to an unnamed fabricator.
WESTON, MASS., 125 tons, Boston & Maine Railroad bridge, to Boston Bridge Works, Inc.
ORANGE, MASS., 104 tons, Boston & Maine Railroad bridge, to Shoemaker Bridge Co.
WORCESTER, MASS., 100 tons, hospital addition, to Eastern Bridge & Structural Co.
NEW HAVEN, CONN., 640 tons, Sterling Hall of Medicine, reported last week as awarded to Shoemaker Bridge Co. went to a New England fabricator.
NEW YORK, 640 tons, apartment building at 317 East Fiftyth Street, to Drier Iron Works.
NEW YORK, 1030 tons, loft building, Seventh Avenue and Thirtieth Street, to Drier Iron Works.
NEW YORK, 2380 tons, apartment building at Ninety-second Street and Central Park West, to McClintic-Marshall Co.
NEW YORK, 2300 tons, London Terrace Apartments on West Twenty-third Street, to Levering & Garrigues.
NEW YORK, 4000 tons, office building at Fifty-third Street and Madison Avenue, to Hedden Iron Construction Co.
BROOKLYN, 600 tons, apartment building on Henry Street, to George A. Just Co.
FLUSHING, N. Y., 300 tons, service station for New York & Queens Electric Lighting Co., to Shoemaker Bridge Co.
BINGHAMTON, N. Y., 200 tons, Nurses' Home, to Bethlehem Steel Co.
AUBURN, N. Y., 260 tons, Mercy Hospital, to Leach Structural Steel Co.
LINDEN, N. J., 150 tons, plant addition for John F. Norman Co., to Austin Co.
PHILADELPHIA, 1200 tons, Bell Telephone Co. building, to Shoemaker Bridge Co.
WASHINGTON, 200 tons, new school, to Ingalls Iron Works.

The South

ROANE COUNTY, TENN., 500 tons, State highway bridge, to Virginia Bridge & Iron Co.
RICHMOND, VA., 700 tons, hotel, to Ingalls Iron Works.

Central States

TOLEDO, OHIO, 1700 tons, art museum, to Hiner Structural Steel Co.
CINCINNATI, 105 tons, Boye & Emmes Machine Tool Co., to Austin Co.
GALION, OHIO, 100 tons, United States Steel Grave Vault Co., to Austin Co.
COLUMBUS, OHIO, 1050 tons, union station, to McClintic-Marshall Co.

MILWAUKEE, 1200 tons, building No. 108 for A. O. Smith Corporation, to Lakeside Bridge & Steel Co.
MILWAUKEE, 250 tons, extension of dryer house at Jones Island sewage disposal plant, to Worden-Allen Co.
HIBBING, MINN., 700 tons, shaft sets for Pickands, Mather & Co., to Worden-Allen Co.
CHICAGO, 1200 tons, elevated platform extensions, to Hansell-Elcock Co., local.
CHICAGO, 1700 tons, north approach to outer drive bridge, to American Bridge Co.
CHICAGO, 300 tons, Fine Arts Building, to McClintic-Marshall Co.
EAST CHICAGO, IND., 1500 tons, intake, to Petroleum Iron Works, Sharon, Pa.
SPRINGFIELD, ILL., 400 tons, highway bridge, to Clinton Bridge Works.
ST. LOUIS, 1000 tons, small buildings for Texas-Chicago pipe line, to Mississippi Valley Structural Steel Co.
JEFFERSON CITY, MO., 600 tons, highway bridges in Davis County, to Missouri Valley Bridge & Iron Co.

Western States

TULSA, OKLA., 325 tons, derrick tops for Carter Oil Co., to Jones & Laughlin Steel Corporation.
WICHITA, KAN., 1075 tons, Post Office, to Mississippi Valley Structural Steel Co.
HOPE, ARK., 550 tons, 225-ft. bridge spans, to unnamed fabricator.
SEATTLE, 450 tons, plates, surge tank for Diablo power plant, to Commercial Boiler Works.
ENUMCLAW, WASH., 100 tons, plates, boilers for White River Lumber Co., to Puget Sound Machinery Depot.
CALDWELL, IDAHO, 115 tons, creamery, to Austin Co.
DOUGLAS, ARIZ., 350 tons, smelter stack for Calumet & Arizona Mining Co., to Kansas City Structural Steel Co.
CLAREMONT, CAL., 575 tons, auditorium, to Pacific Iron & Steel Co.
PITTSBURG, CAL., 400 tons, plant for Stockton Firebrick Co., to Dyer Brothers.

Canada

HAWKESBURY, ONT., 2500 tons, Hawkesbury-Grenville bridge, to Canadian Bridge Co.
QUEBEC, 500 tons, Limoullou bridge, to Eastern Canada Steel & Iron Works.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

CAMBRIDGE, MASS., 275 tons, freshman dormitory, Harvard College.
BARTLETT, N. H., 100 tons, State bridge.
EVERETT, MASS., 106 tons, hospital.
CAMBRIDGE, MASS., 100 tons, Kirkland House and John Winthrop dormitories.

NEW YORK, 200 tons, Institute for Crippled and Disabled Children, First Avenue.

NEW YORK, 5000 tons, subway section 8, route 107 in Brooklyn; bids open Sept. 26.

STATE OF NEW YORK, 200 tons, highway bridges.

WHITE PLAINS, N. Y., 250 tons, office building for Westchester Lighting Co.

PHILADELPHIA, 1000 tons, building for tubercular patients, Philadelphia General Hospital.

PHILADELPHIA, 5000 tons, Market Street subway section; Dravo Contracting Co., Pittsburgh, low bidder on general contract.

The South

NEW ORLEANS, 1850 tons, for Bienville and Mandeville Street wharfs.

DALLAS, TEX., 400 tons, bridge for North Texas Traction Co., across Trinity River; Austin Bridge Co., general contractor.

Central States

CARBONDALE, ILL., 140 tons, warehouse for Kroger Grocery & Baking Co.

FARGO, N. D., 400 tons, department store.

WATERTOWN, WIS., 200 tons, Milwaukee Street bridge over Rock River; bids opened.

Western States

OKLAHOMA CITY, 300 tons, Walker Avenue subway for Rock Island Railroad.

SPOKANE, WASH., 300 tons, Fox theater; bids being taken.

OLYMPIA, WASH., 300 tons, bridge over Hoh River; bids opened.

PHOENIX, ARIZ., 205 tons, bridge on Ash-fork-Kingman highway; bids Sept. 22.

LOS ANGELES, 1800 tons, State Building; bids opened Aug. 5 were rejected, new bids Sept. 30.

Railroad Equipment

Lehigh & New England has ordered 300 all-steel box cars and five caboose cars from Magor Car Corporation, six auxiliary locomotives from Bethlehem Steel Co. and two Decapod-type locomotives and three heavy switching engines from Baldwin Locomotive Works at a cost of about \$1,000,000.

New York Central has ordered 50 milk cars from Merchants' Despatch, Inc.

Tennessee Copper Co. is in the market for 50 acid tank cars.

Santa Fe is inquiring for 10 horse express cars.

Illinois Steel Co. will buy 10 roll transfer cars.

More Typewriters Shipped in 1929

WASHINGTON, Sept. 8.—Total shipments of typewriters and parts in 1929 by 28 manufacturers reporting to the Bureau of the Census amounted to 588,769 units, valued at \$31,368,939. These figures represent an increase of 6.1 per cent in quantity and a decrease of 1.3 per cent in value, compared with 555,021 units, valued at \$31,770,405, reported by 26 manufacturers for 1927.

Total value of the products of the industry, including portable and book-keeping-billing typewriters, rebuilt typewriters, and parts, amounted to \$66,039,468, an increase of 19.4 per cent as compared with \$55,318,864 for 1927.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper Quiet—Tin Inactive —Lead Steady—Zinc Weak

NEW YORK, Sept. 9.

Copper

There are indications that electrolytic copper, at 10.75c., delivered in the Connecticut Valley, is considerably scarcer. Sales in smaller volume are still being made at that quotation, but there are reports that the two companies which have been selling at this level will shortly be at the 11c. quotation of all other sellers. Domestic demand is still very light, but orders from abroad are fairly good. Total sales for export thus far this month have been about 9000 tons; the total for all of August was 23,000 tons.

Reliable estimates are that domestic consumers must still purchase metal for the next four months, some of it even for September. Foreign consumers are covered more for September than for any other month and have bought very little November metal. One authority states that from 225,000 to 250,000 gross tons must still be purchased this year for foreign and domestic use, based on the average consumption for the six months prior to September. Statistics for August, which will be out next week, are expected by some to show a slight increase in stocks of refined metal. Lake copper is unchanged and quiet at 11c. and 11.12½c., delivered.

An interesting observation is to the effect that the merger of the Phelps-Dodge organization with the Nichols company and the possibility of another merger will tend to stabilize the market.

Tin

Extreme dullness still prevails. Sales for the week did not make a good total. There is no interest on the part of consumers or dealers and the market is a waiting one. A feature is the steadiness of prices. During the week London prices have varied no more than 12s. 6d. a ton each day for all positions, with quotations today the same as a week ago with the exception of that at Singapore. Spot standard was quoted at £133 12s. 6d, future standard at £135 7s. 6d. and spot Straits at £135 5s. 6d. The Singapore price today was £137 10s. At New York prices have hovered very close to 29.75c., with the quotation today at 29.87½c. Stocks in London warehouses on Sept. 6 were 25,341 tons, an increase of 15 tons for the week. This would have been larger had not 300 tons been shipped to the United States.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 9	Sept. 8	Sept. 6	Sept. 5	Sept. 4	Sept. 3
Lake copper, New York.....	11.12½	11.12½	11.12½	11.12½	11.12½	11.12½
Electrolytic copper, N. Y.*.....	10.50	10.50	10.50	10.50	10.50	10.50
Straits tin, spot, N. Y.	29.87½	29.80	....	29.62½	29.62½	29.62½
Zinc, East St. Louis.....	4.30	4.30	4.30	4.30	4.30	4.30
Zinc, New York.....	4.65	4.65	4.65	4.65	4.65	4.65
Lead, East St. Louis.....	5.35	5.35	5.35	5.35	5.35	5.35
Lead, New York.....	5.50	5.50	5.50	5.50	5.50	5.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Lead

Demand is light and confined to carload and small lots for September delivery. Quotations are firm at 5.35c. St. Louis, and 5.50c. New York, the latter being the contract price of the leading producer.

Zinc

Weakness has developed in prime Western zinc because the August statistics showed an increase in stocks of 5254 tons, the total in producers' hands on Aug. 31 being 122,635 tons. Naturally, demand is exceedingly small and it is doubtful whether metal could be sold at 4.30c., East St. Louis or 4.65c. New York, which are the nominal quotations today. Ore at Joplin is unchanged at \$31. Production was about 8300 tons last week, with shipments at 7232 tons and sales at 7300 tons.

Antimony

The market for Chinese metal continues featureless and quiet, with quotations unchanged at 7.75c. to 7.87½c. for spot and 7.62½c. for futures.

Nickel

There is no change in the long established quotations. Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c. and with electrolytic nickel in cathodes at 35c.

Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 9.—New sales continue to climb slowly. In the meantime prices are showing a greater

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.	
High brass	17.75c.
Copper, hot rolled, base sizes.....	20.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	23.00c.
Seamless Tubes—	
Brass	22.75c.
Copper	23.00c.
Brass Rods.....	16.12½c.
Brazed Brass Tubes.....	25.37½c.

New York Warehouse

Delivered Prices, Base per Lb.	
Zinc sheets (No. 9), casks	9.75c. to 10.25c.
Zinc sheets, open.....	10.75c. to 11.25c.

Metals from New York Warehouse

Delivered Prices, per Lb.	
Tin, Straits pig.....	32.00c. to 33.00c.
Tin, bar	34.00c. to 35.00c.
Copper, Lake	12.75c.
Copper, electrolytic	12.50c.
Copper, casting	12.25c.
Zinc, slab	6.25c. to 7.25c.
Lead, American pig.....	6.50c. to 7.00c.
Lead, bar.....	8.50c. to 9.00c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ¼.....	22.50c. to 23.50c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.	
Tin, Straits pig.....	34.75c.
Tin, bar	36.75c.
Copper, Lake	12.25c.
Copper, electrolytic	12.25c.
Copper, casting	11.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig.....	6.25c. to 6.50c.
Lead, bar	8.75c.
Antimony, Asiatic	12.50c.
Babbitt metal, medium grade.....	17.50c.
Babbitt metal, high grade.....	38.00c.
Solder, ½ and ¼.....	21.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.00c.	10.00c.
Copper, hvy. and wire	8.75c.	9.75c.
Copper, light and bottoms	7.50c.	8.50c.
Brass, heavy.....	5.00c.	6.25c.
Brass, light.....	4.50c.	5.75c.
Hvy. machine composition	7.75c.	8.50c.
No. 1 yel. brass turnings	5.50c.	6.50c.
No. 1 red brass or compos. turnings...	7.00c.	8.00c.
Lead, heavy.....	4.25c.	4.75c.
Lead, tea.....	3.00c.	3.50c.
Zinc	2.25c.	2.75c.
Sheet aluminum.....	7.50c.	9.50c.
Cast aluminum.....	7.00c.	9.00c.

degree of stability. The old metal market is quiet and prices are steady.

Prices per lb., in carload lots: Lake copper, 11.125c. to 11.25c.; tin, 30.40c.; lead, 5.45c.; zinc, 4.40c.; in less-than-carload lots, antimony, 9.12½c. On old metals we quote copper wire, crucible shapes and copper clips, 9c.; copper bottoms, 7.25c. to 7.75c.; red brass, 7.25c. to 7.75c.; yellow brass, 5c. to 5.50c.; lead pipe, 4c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 17.50c.; block tin, 22.50c.; aluminum, 7c. to 7.50c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Bridge and Highway Work in Kentucky Will Take 3000 Tons

AWARDS of reinforcing steel the past week totaled 6000 tons, the largest, 1000 tons, for a plant at Seattle for the American Can Co. Other lettings range from 100 to 800 tons. Including 3000 tons for bridge and highway work in Kentucky and 1000 tons for a sewer project in Brooklyn, new jobs up for bids call for 7400 tons. Awards follow:

ANDOVER, MASS., 250 tons, roadwork, to an unnamed bidder.
BROCKTON-AVON, MASS., 100 tons, roadwork, to Northern Steel Co.
BROOKLYN, 200 tons, Avenue Y telephone building, to Joseph T. Ryerson & Son, Inc.
WESTCHESTER COUNTY, N. Y., 250 tons, Bronx River Parkway extension, to Concrete Steel Co.
RAHWAY, N. J., 120 tons, addition to State reformatory, to Kalman Steel Co.
NEWARK, N. J., 120 tons, telephone building, to Faltoute Iron & Steel Co.
STAMFORD, CONN., 100 tons, warehouse for Stamford Gas & Electric Co., to Jones & Laughlin Steel Corporation.
WHITE PLAINS, N. Y., 160 tons, distributing station for Sheffield Farms, Inc., to Truscon Steel Co.
BALTIMORE, 120 tons, Nurses' Home, to Joseph T. Ryerson & Son, Inc.
MIAMI, FLA., 160 tons, club house for Indian Creek Golf Club, to Joseph T. Ryerson & Son, Inc.
BUFFALO, 700 tons, Bailey Avenue Market Terminal, to a local bidder.
CLEVELAND, 135 tons, Acme building, to Truscon Steel Co.
CHICAGO, 145 tons, superstructure for north approach to outer drive bridge, to American System of Reinforcing.
COOK COUNTY, ILL., 800 tons, bridge work, to unnamed bidders.
JEFFERSON CITY, Mo., 160 tons, garage for Missouri Highway Commission, to Laclede Steel Co.
ST. LOUIS, 350 tons, Union Avenue viaduct for St. Louis Board of Public Service, to Missouri Rolling Mills Corporation.
SEATTLE, 1000 tons, American Can Co. plant, to Pacific Coast Steel Corporation.
SEATTLE, 100 tons, addition to garage on Second Avenue, to Northwest Steel Rolling Mills.
SEATTLE, 145 tons, warehouse, First Avenue South, to Pacific Coast Steel Corporation.
YAKIMA, WASH., 350 tons, office building on South Second Street, to Northwest Steel Rolling Mills.
SAN JOSE, CAL., 307 tons, Hale Brothers store, to Pacific Coast Steel Corporation.

CLAREMONT, CAL., 200 tons, auditorium, to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 500 tons, Professional Building.
BROOKLYN, 1000 tons, storm sewer, Avenue X; revised general contract bids to be taken soon.
BERGEN COUNTY, N. J., 500 tons, State highway section 7, route 4, Passaic River bridge and approaches; Maggi & Schoonover, Paterson, N. J., low bidders on general contract.
BERGEN COUNTY, N. J., 1500 tons, pavement and approaches, Fort Lee bridge; George M. Brewster & Son, low bidders on general contract.
BROOKLYN, 500 tons, subway route 107, section 8, Lafayette Street; new bids on general contract Sept. 26.
QUEENS, NEW YORK, 700 tons, subway route 108, section 6; revised general contract bids to be taken next week.
BROOKLYN, 225 tons, warehouse for Franklin Furniture Co.
STATE OF KENTUCKY, 3000 tons, bridge and highway work; bids close Sept. 10, 14 and 18.
SPRINGFIELD, ILL., tonnage being estimated, State highway work.
CHICAGO HEIGHTS, ILL., 250 tons, high school building; tonnage reduced 600 tons because of changes in design and material.
HINSDALE, ILL., 100 tons, old peoples' home.
ST. LOUIS, 150 tons, Board of Education, for Hadley Vocational School building.
ST. LOUIS, 315 tons, Maline Creek sewer, for Board of Public Service.
LOS ANGELES, 200 tons, office building, Vermont Street; bids being taken.
OAKLAND, CAL., 134 tons, two bridges for Alameda County; bids Sept. 23.

Believes Scrap Prices Are Due for a Rise

Prices for scrap iron and steel in all markets have reached bottom and all factors in the industry indicate that markets are set for a rise, according to the results of a survey of the principal scrap markets made by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, Inc. The report covered the Pittsburgh, Youngstown, Cleveland, Detroit, Buffalo, Chicago, St. Louis, Philadelphia, New York, Boston and Cincinnati markets.

The small stocks of scrap in dealers' yards throughout the country and the comparatively low inventories of scrap at steel mills have served to keep scrap markets firm during the past few weeks and are factors which will contribute stability to scrap markets in the near future, it was indicated by the report. There is a comparative shortage of the heavier and better grades of scrap iron and steel, because of the low rate of operations in the principal industries which are producers of scrap in their processes of fabricating steel products. The inflow of country scrap, which constitutes a principal source of supply, has been at the lowest point in many years, because the present prices for scrap do not warrant its collection.

New York Iron and Steel Market

(Concluded from page 730)

ing limited to small orders to complete contracts. About 800 tons of large-sized pipe for the Westchester County Sewer Commission is reported to have been placed with R. D. Wood & Co. American producers of pipe are bidding for about 8500 tons of 8 to 24-in. for export to the Far East. Bids open Sept. 15 on 1000 tons of 6 and 10-in. water pipe for Fishkill, N. Y.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

Coke

Despite the approach of fall and an increased demand for heating coke, furnace grade is still quoted at \$2.50 to \$2.60 a net ton, Connellsville. Quotations on foundry coke are as follows:

Special brands of beehive foundry coke, \$4.70 to \$4.85 a net ton, ovens, or \$8.41 to \$8.56 delivered to northern New Jersey, Jersey City and Newark, and \$9.29 to \$9.44 to New York and Brooklyn; by-product foundry coke, \$9 to \$9.40, Newark or Jersey City; \$10.06, New York or Brooklyn.

Old Material

Brokers buying No. 1 heavy melting steel for eastern Pennsylvania mills report a slightly easier supply at \$12.50 a ton, delivered, as they are able to offer holders in local New Jersey \$7.85 a ton f.o.b., while unprepared scrap is quoted at about \$6.50 a ton, f.o.b. No. 1 heavy melting steel continues to be bought at \$10 to \$10.25 a ton, on barge, New York, for shipment to Buffalo consumers. Other grades are inactive.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..	\$9.00 to \$10.50
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy breakable cast..	8.00 to 9.00
Stove plate (steel works)...	6.00 to 6.25
Locomotive grate bars....	6.00 to 6.50
Machine shop turnings....	5.00 to 5.25
Short shovelling turnings..	5.00 to 5.50
Cast borings (blast fur. or steel works)	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Steel car axles.....	17.00
Iron car axles.....	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire	7.50
No. 1 railroad wrought...	9.75
No. 1 yard wrought, long..	8.75
Rails for rolling.....	9.50 to 10.00
Stove plate (foundry)....	7.00
Malleable cast (railroad)...	10.50 to 11.00
Cast borings (chemical)...	8.50 to 9.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.) ; cupola size.....	12.00
No. 2 cast (radiators, cast boilers, etc.)	11.50

A new American standard for symbols for photometry and illumination has been adopted by the American Standards Association, the new standard being a modification of the American standard for illuminating engineering nomenclature and photometric standards adopted in 1925.

Downward Trend in Automobile Output May Not Yet Be Halted

Detroit, Sept. 8.

THAT August automobile production has been estimated by the National Automobile Chamber of Commerce at 240,100 cars, or 12 per cent less than in July, has caused little surprise in Detroit. People close to the industry have suspected that much of the talk about increased output since the holiday recess was directed toward bolstering the faltering confidence of the public in the industrial situation, and the publication of these figures has confirmed their suspicions. When it is remembered that July was a month of wholesale shutdowns in automobile plants, the low mark in August becomes even more significant. It means that, so far as motor cars are concerned, the bottom of the depression came a month later than expected.

Even now the picture is far from cheering. Chevrolet is reported to be easing off production during a period when it is preparing to start the manufacture of its 1931 model. Buick's schedule this month shows a substantial decline from that of August. The various divisions of the Chrysler Corporation are said to be turning out cars on a sharply curtailed basis. Oakland-Pontiac, Oldsmobile-Viking and Hudson-Essex are comparatively quiet. The Ford Motor Co. continues to set the pace for the industry with a production of about 7000 cars a day on a four-day week. It is likely that this rate will be maintained by Ford through September and possibly October.

Downward Trend May Not Yet Be Halted

DESPITE the assurance of well-sustained activities by the Ford company, indications are that production for the entire country in September will show that the downward trend has not yet been halted. Automobile makers are holding firmly to a conservative policy for synchronizing manufacturing rates with retail sales. They are particularly eager to avoid the accumulation of excess stocks which later would have to be worked off to the further detriment of their business. They consider it more desirable to go through a lean period now and emerge from it in a healthy state than to stimulate operations artificially in order to satisfy the craving for a larger amount of current activities.

Automobile output in August 12 per cent less than that of July.

* * *

Production schedules for this month indicate that downward trend may not yet be halted.

* * *

Many companies working on development of new models.

* * *

One of the bright spots is in the truck field, where demand for light delivery vehicles is relatively better than business in passenger cars.

Many companies are working feverishly on the development of new models, pinning their faith in a revival of their fortunes on the introduction of fresh designs. The success of the Cadillac V-16 is beckoning competitors into that field; on the other hand, the disappointing sales of one maker which recently put on the market a medium-priced car closely resembling a much higher priced product of another company has had a salutary effect on other manufacturers, who are profiting by the lesson.

One who looks for bright spots will find encouragement in the truck field. The demand for light trucks has been relatively better than for passenger cars. That makers are watching this end of their business closely is shown by the fact that several have recently announced new truck models. Notable gains in retail sales have been made in the light delivery truck division this year, despite the general slump in business. Orders for buses have been gaining in recent weeks.

Parts and accessories companies naturally have followed the parent industry in operations. Those supplying the Ford company have been busy, but others have had varying fortunes. August brought a decline from July, and September will not show any improvement. There has been a fair replacement market.

In iron and steel circles interest has centered on the placing of the tonnage requirements for the first

20,000 of the new Chevrolet cars. Aside from this transaction, mills have been scrambling for the comparatively small orders and specifications coming out of district automobile plants. Efforts looking toward improvement in prices of sheets are giving the market a stronger tone, but this movement is somewhat discounted because large sheet makers are reported to have protected customers at the old schedule for some time ahead. In some cases the protection period is said to extend until the end of the year.

Steel Freight Rates Interest Automobile Makers

WITH retail automobile prices pointing downward and with automobile makers striving to gain every advantage in lowering production costs, it is interesting to note that the industry looks upon iron and steel freight rates from the mills to the Detroit district as a matter of prime concern. In the efforts now being made to set up new rates to conform to the recent change in the rate structure in Official Classification territory, automobile manufacturers are represented to see that they obtain every possible consideration. Naturally they feel that whatever freight rates are put on their raw materials must be borne by them and therefore are just as important to them as to the steel people. It is well known that the motor car industry long has been of the opinion that railroad freight rates on finished automobiles have been too high and the result has been a pronounced swing toward shipment to dealers by automobile trucks. Automobile makers have not been backward about telling the railroads what they think of excessive rates and have shown the carriers figures confirming the lessened volume of railroad traffic in finished cars. One could easily conjure up the picture of representatives of the industry using these facts to convince the railroads that it is to their advantage to keep the rates of raw materials as low as possible or ways and means will be found to divert some of this tonnage to other forms of transportation.

This matter of freight rates is a major factor in the recent development of a practice which is deplored by many sheet and strip steel makers, that of blanking disks for consumers before they leave the mills. Although this practice is compara-

tively new in the relationship of the steel and automobile industries, this type of service to steel users dates back some few years to the time when an Eastern steel maker is said to have installed presses for blanking out disks for agricultural implement plants. Its revival recently is due largely to the fact that automobile parts manufacturers, especially makers of brake drums, discovered that they could save about \$3 a ton by having the mills ship them blanks instead of sheets or strips. Moreover, the cost of shipping scrap back to the steel plants is saved, thus reducing the price which steel mills must pay for scrap. In at least one case it is said that a Detroit wheel manufacturer paid for installing presses at the steel mills, but this is an exception, as the mills in general have been shouldering the expense. Perhaps half a dozen steel companies have taken up this practice and others are ready to adopt it in the near future. Even some of the mills within a short distance of Detroit are venturing into this new service, claiming that they are compelled to do so in self-defense. The rather amazing thing is that this custom is roundly denounced by almost all mills, yet is growing rapidly. One influential maker declares that the practice could have been stopped if something had been done about it some time ago, but it has gone so far now that a movement to halt its further progress would be futile.

Oil Well Supply Ratifies Sale to U. S. Steel

Stockholders of the Oil Well Supply Co., Pittsburgh, at a special meeting on Sept. 9 voted by a majority of more than 84 per cent of the common stock to sell the company's assets to the United States Steel Corporation on terms recently announced. Transfer of assets will be completed on or before Sept. 30.

Status of Steel Foundries

In mid-August 20 members of the Steel Founders' Society of America, representing 33½ per cent of the capacity of the 60 foundries reporting, were running at less than 50 per cent of capacity, 18 (30 per cent of the capacity represented) were operating at 50 to 59 per cent, and the remaining 22 were producing at rates ranging from 50 per cent upward.

In July, 16 of 63 foundries (25.4 per cent of the capacity represented) operated at less than 50 per cent, 15 plants (23.8 per cent of the capacity reporting) ran at 50 to 59 per cent, 11 (17.5 per cent of the capacity reporting) ran at 60 to 69 per cent, and the remaining 21 operated at rates ranging from 70 per cent upward.

Mid-August bookings of 26, representing 41.3 per cent of the capacity of 63 plants reporting, were at less than a 50 per cent rate, those of 20 (31.7 per

cent of the capacity represented) were at rates ranging from 50 to 59 per cent, and the bookings of the 17 remaining foundries were at rates ranging from 60 per cent upward.

Eastern Steel Co.'s Creditors Meet

At a recent meeting of the creditors of the Eastern Steel Co., Pottsville, Pa., held before Archibald T. Johnson, Philadelphia attorney, about 15 creditors were represented. The opinion was rather generally expressed that the company was operating satisfactorily, considering the depressed business situation. No report has as yet been submitted to the court.

British Steel Institute's Technical Program

The technical program of the autumn meeting of the Iron and Steel Institute at Prague, Czechoslovakia, Sept. 15 and 16, is announced as follows:

"High-Frequency Steel Furnaces," by D. F. Campbell.

"Permanence of Dimensions under Stress at Elevated Temperatures," by W. H. Hatfield.

"The Heterogeneity of an Ingot Made by the Harmet Process," by A. Kriz.

"A Contribution on the Constitution of the Fe-C-Si System," by A. Kriz and F. Paboril.

"A Contribution on the Problem of the Analysis of Basic Slags and the Representation of their Composition in a Triangular Diagram," by O. Quadrat.

"The Magnetometric Determination of the Curie Points," by A. Regner.

"What Reasons Compelled the Prague Ironworks to Introduce Thin-Walled Blast Furnaces," by J. Sarek.

"The Effect of Contamination by Nitrogen on the Structure of Electric Welds," by L. W. Schuster.

"The Quantitative Analysis of Steels by Spectrum Analysis," by F. Twyman and A. A. Fitch.

"The Mechanism of the Solution of Cementite in Carbon Steel and the Influence of Heterogeneity," by E. Wallidow.

"Open-Hearth Furnace Steelworks. A Comparison of British and Continental Installations and Practice," by H. C. Wood.

Buffalo Pipe Plant to Commence Operations

The Buffalo Pipe & Foundry Co., recently organized by Frank B. Baird, has taken over the idle Arco plant of the American Radiator Co. at Buffalo for the production of cast iron soil pipe. Headquarters are at 9 Austin Street, where remodeling of the former Arco plant is under way. Production will get under way soon.

Mr. Baird formed the Buffalo Furnace Co. in 1892 and was also one of the organizers of the Union Iron Works in 1898 and the Buffalo Charcoal Co. in 1899. These three companies were later merged as the Buffalo Union Furnace Co., now controlled by the Hanna Furnace Co., a subsidiary of the National Steel Corporation.

Non-Ferrous Ingot Metal Average Prices

CHICAGO, Aug. 28.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ending Aug. 15.

As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item, in reality, includes many variations in formulas. Until the program of the standardization of the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades:"

	Cents
Commercial, 80-10-10 (1 per cent impurities)	12.046
Commercial 78 per cent metal.....	10.254
Commercial 81 per cent metal.....	10.448
Commercial 83 per cent metal.....	10.771
Commercial 85-5-5-5.....	11.031
Commercial No. 1 yellow brass ingot	8.538

Newport News Shipyard Low on Aircraft Carrier

WASHINGTON, Sept. 9.—The bid of \$15,560,000, made by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was the lowest submitted on Sept. 3 for constructing aircraft carrier No. 4. The new carrier, the only one for which the Navy Department ever received bids, will have a designed displacement of 13,800 tons.

The carrier will require 7800 tons of ordinary steel, 80 tons of special treatment steel and 150 tons of castings and forgings.

Secretary of the Navy Adams has stated that an award may not be made, since there is no certainty that sufficient funds are available.

New Hevi-Duty Electric Plant

A brief description of enlarged facilities in the plant of the Hevi-Duty Electric Co., Milwaukee, is covered in bulletin 630 of four pages illustrated. At the new address, 41 Highland Boulevard, the production shop is located in a building divided in two bays—one for industrial furnace erection and the other for the straight-line production of laboratory furnaces and hot plates. Arc and gas welding apparatus and other machines necessary form part of the equipment. All furnaces within railroad clearances are erected completely in the plant. Large furnaces are fully assembled in the plant for final adjustment, and then disassembled for shipment.

Manganese Not Dumped

So Declares Thomas J. Doherty, on Behalf of
American Iron and Steel Institute



Washington, Sept. 9.—Thomas J. Doherty, tariff counsel for the American Iron and Steel Institute, made the following statement here today at the hearing conducted at the

Bureau of Customs relative to charges that manganese ore is to be imported from Russia at prices which are in violation of the anti-dumping statute of 1921:

"The American Iron and Steel Institute as such has no interest in manganese ore, but it is deeply concerned that an adequate supply of ferromanganese should be assured to the steel producers of the United States, all of whom are comprised within its membership.

"A few fundamentals may be here set forth. Ferromanganese is an absolute necessity in the manufacture of steel and no substitute for it has ever been discovered. Now ferromanganese is made by reducing manganese ore in a blast furnace. The ferromanganese of commerce and the only ferromanganese that would be accepted in the trade must contain 78 to 82 per cent metallic manganese. Less than 78 per cent would be unacceptable and more than 82 per cent would be an unnecessary and useless extravagance. Now in order to obtain ferromanganese of 78 to 82 per cent content you must have a manganese ore containing about 50 per cent metallic manganese. And that is just why manganese ore has to be imported from foreign countries. There is little or none of such ore found in the United States, and the relatively small quantity that is produced here is obtained through beneficiation processes which are very costly.

Declares There Is No Dumping

"The anti-dumping statute may be violated in two ways. First, the imported merchandise may be sold to the United States at less than the price at which it is sold for consumption in the country of origin; and second, the imported merchandise may be sold for export to the United States at a lower price than it is sold for export to other countries. It is understood, of course, that to constitute an infraction of the statute these practices must result in damage to or destruction of an established domestic industry or must have the effect of preventing the establishment of such industry.

"Taking up first the question as to whether Russian manganese ore is

sold for export to the United States at lower prices than it is sold for home consumption, I wish to point out preliminarily that, in view of the vast production and small consumption of manganese ore in Russia, dumping is not merely inherently improbable, but it is in fact an economic impossibility.

"Where a country produces sufficient of a commodity to supply the entire domestic demand and it still has a large surplus to be disposed of, the tendency is for it to dump that surplus into foreign countries. No such condition exists in Russia. As a matter of fact, manganese ore, not only in Russia but in all the countries that produce it, is strictly an export proposition. In none of them is there any manganese-consuming industry which would make domestic consumption of manganese economically important. Therefore, there can be no dumping because it is impossible to imagine a country creating a dumping situation by selling the negligible portion of the product that it uses at prices higher than it obtained for the 90 per cent or more that it exports.

"It is also a matter of actual fact that the manganese ore which is exported from Russia to the United States is not sold in or used in Russia at all. The only manganese ore that is used in Russia is that obtained in the Nikopol district, in the Ukraine, whereas the manganese ore that is exported to the United States is obtained from the Tchiaturi district in the Soviet republic of Georgia. It is often referred to as Caucasian ore. The Nikopol ore is cheaper than the Tchiaturi ore and therefore the condition that actually exists is the exact opposite of what constitutes dumping.

Compares World Prices for Ore

"Nor is manganese ore sold for export to the United States from Russia at prices lower than it is sold to other countries. This fact is easily demonstrated. Manganese ore is a world product, there are world markets for it, and there are world prices quoted and published as freely as the prices of sugar and any other commodity of world-wide importance.

"We have to refer only to various trade publications to prove this. The latest issue of THE IRON AGE, Sept. 4, 1930, page 654, gives the price of manganese ore from the Caucasus, 52 per cent, c.i.f. Philadelphia or Baltimore, 26c. to 28c. per unit, and it gives exactly the same price for Brazilian, African, or Indian manganese ore, basic 50 per cent.

"Steel (formerly the Iron Trade Review) of Sept. 4, 1930, page 88, quotes Caucasian ore, 52 to 55 per cent, and

Indian ore, 48 to 50 per cent, at 27c. to 28c.; and quotes Brazilian ore, 46 to 48 per cent, at 25c. per unit. These are c.i.f. prices.

"A reference to back numbers of these periodicals for several months shows no material change in the relativity of these prices.

"As to foreign markets, the German periodical *Stahl und Eisen* of Aug. 7, 1930, page 1147, which is the latest to quote prices, gives 12 pence per unit for washed Caucasian ore, 52 per cent, delivered at Antwerp or Rotterdam. It is obvious from this price that the United States is really paying more for Russian manganese ore than are European purchasers, for the largest individual American purchaser of Russian manganese ore is paying 30c. per unit.

Ample Supplies of Manganese Ore

"There is a very informative article on this subject on page 396 of *Commerce Reports*, issue of Aug. 18, 1930, by James W. Furness and Donald P. Lloyd of the Minerals Division of the Department of Commerce. I shall not take time to read this article, but I should like to point out two very significant features thereof. One is that there is a very large accumulation of manganese ore in British India awaiting a market. The other is the reference to Gold Coast production, which says: 'It has been reliably stated that the properties now being developed will be able to produce high-grade manganese for many years to come at a figure substantially lower than that in India, Russia and Brazil.'

"The point of all this is that if there are any additional burdens by way of duty on manganese ore from any one of the world's producers, or if there were a complete embargo of manganese ore from any of them, or from all of them except one, that one would be able to supply the entire demands of the American market.

"As pointed out in that article, there is now, there has been for some time, and there will continue to be a buyer's market for manganese ore. In connection with this I may point out that manganese ore has not suffered so severe a decline as some of the other nonferrous products such as tin, copper, zinc, lead, and antimony, all of which are selling at the present time below their prewar price levels. Manganese has held its price better than those metals. It would seem that the existing duty on manganese ore is heavy enough for here is a duty of 22c. per unit on an article that at the foreign port of shipment is valued at, say, 20c. to 22c."

C. K. Olberg, for many years connected with the Hale & Kilburn Co., Philadelphia, manufacturer of automobile bodies and pressed steel specialties, has entered business as manufacturers' representative under the name of Charles K. Olberg Co., with offices in the Weightman Building, 1524 Chestnut Street, Philadelphia.

PERSONALS

HARRY T. GILBERT, vice-president in charge of sales of the Republic Steel Corporation since its formation early this year, has been made special assistant to the president and has been



Harry T. Gilbert



Norris J. Clarke

succeeded by NORRIS J. CLARKE, who has been vice-president and chairman of the executive committee of the Lamson & Sessions Co., Cleveland. Mr. Gilbert will assist T. M. GIRDLER, chairman and president of the Republic Corporation, in important matters of policy in the commercial affairs of the corporation and its subsidiaries. He has been affiliated with the iron and steel industry as a sales executive for many years. He was vice-president in charge of sales of the Republic Iron & Steel Co., which formed a nucleus for the Republic Steel Corporation merger, and previously was vice-president of the Sharon Steel Hoop Co. Mr. Clarke formerly was president of the Lake

Erie Bolt & Nut Co., Cleveland, which he organized in 1919, and when that company was merged with Lamson & Sessions Co. in December, 1929, he became an officer of the latter company. He began his business life in 1896 as an office boy with the Bourne-Fuller Co., now one of the units of the Republic Steel Corporation. Later he worked up in the sales department and became manager of the company's Pittsburgh office in 1905. In 1912 he was made secretary and director and in 1918 became vice-president of the Upson Nut Co., which later was taken over by the Bourne-Fuller Co. In 1918 he served as major in the Ordnance Department in Washington.

FRANK B. DELONG, for several years manager of the Seattle office of Grinnell Co. of the Pacific, has been made Pacific Coast manager. R. F. WADICK, heretofore manager of the fire protection division of the company, has become manager of this division of all Pacific Coast branches.

F. H. CHAPIN, president, National Acme Co., Cleveland, sailed for Europe on Sept. 5 on a five week's business trip to Germany, France and England. He plans new connections for foreign representation.

EUGENE TETZLAFF, vice-president and a director of the General Bronze Corporation, has assumed the management of the Chicago, Milwaukee and Minneapolis plants of the company, with headquarters at Chicago. Mr. Tetzlaff was president of the Flour City Ornamental Iron Co., Minneapolis, until its merger last year with the General Bronze Corporation.

FRANK PARKER, vice-president of Briggs & Turivas, Inc., Blue Island, Ill., has resigned, effective Sept. 1, and has organized a new company to be known as Iron & Steel Products, Inc., with offices in the Railway Exchange Building, Chicago. The new company will do a general trading business in iron and steel products, railroad car parts and equipment. Mr. Parker has been in the iron and steel and railroad supply business for about 25 years, 12 years of this time with the Republic Iron & Steel Co. and 13 years with Briggs & Turivas, Inc. He is president of the Chicago chapter of the Institute of Scrap Iron and Steel, Inc.

OLIVER H. MELLUM, assistant vice-president, American Car & Foundry Co., Chicago, recently won first place among baritones in the Chicago Tribune's Chicagoland Music Festival and, as the winner of the contest, gave a half-hour recital Thursday night, Sept. 4, from WGN, the Tri-

bune station on the Drake Hotel, Chicago.

W. H. WILLS, metallurgist, Ludlum Steel Co., Dunkirk, N. Y., was the speaker at the first regular monthly meeting for the 1930-1931 season of the New Jersey chapter of the American Society for Steel Treating on Thursday evening, Sept. 4. His subject was "Tool Steel Applications."

LEWIS E. SKINNER, manager of the Cincinnati plant of Joseph T. Ryerson & Son, Inc., will celebrate his twenty-fifth anniversary in the ser-



Lewis E. Skinner

vice of the Ryerson company on Sept. 18. He joined the Ryerson organization on Sept. 18, 1905, and served as a stenographer through all the departments of the concern. When the Ryerson company purchased the plant of the Cincinnati Iron & Steel Co., Cincinnati, in March, 1923, and established a branch in Cincinnati, Mr. Skinner became manager.

E. LONGDEN, one of the best-known managers of British foundries, is visiting a number of representative foundries in the United States. He recently completed the modernization of the foundries of John Hetherington & Co., Ltd., Manchester, England, prominent textile engineers and machine tool producers. Last year he was president of the Lancashire branch of the Institute of British Foundrymen. He attended the International Foundrymen's Convention held in Detroit, as a British delegate, in 1926.

H. L. MILLER, for several years district sales manager at St. Louis for

the Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed assistant manager of sales in the tube department, with headquarters in the home offices. He has been succeeded at St. Louis by J. B. HUNGATE, who has been identified with St. Louis sales for some time. A. P. HOLLOWAY, who has also been associated with the St. Louis sales organization, has been named district sales manager at Dallas, Tex., with offices at 411-414 Magnolia Building. The Dallas office has previously been a sub-district office under the jurisdiction of St. Louis. M. C. BROWN, who has been identified with pipe sales in the Pacific Coast territory, has been named manager of tube sales in that district, with headquarters at Los Angeles.

HENRY HARNISCHFEGER, president of the Harnischfeger Corporation, Milwaukee, has returned from a visit of four months in Europe. The principal objective of his tour was to lay the cornerstone of a new school in Salmuenster, Hessen-Nassau, Germany, his birthplace, for which he is furnishing the funds.

BENJAMIN SCHWARTZ, director general of the Institute of Scrap Iron and Steel, Inc., will deliver a radio address on scrap as part of the series on "Romance in American Industry." The story of the scrap iron industry will be broadcast over a national hook-up of 34 stations Saturday, Nov. 8, at 8 p. m.

MORT I. MARKS has been made Chicago district manager of the Federal Steel Corporation, Detroit.

ARTHUR G. MCKEE, president, Arthur G. McKee & Co., Cleveland, left Saturday for a three months' trip to Russia and will visit Moscow and Magnitostroy. His firm is in charge of the construction of a large steel plant for the Soviet Government at the latter place.

EDGAR E. BROSIUS, president, Edgar E. Brosius, Inc., Pittsburgh, builder of special equipment for blast furnaces and steel plants, has sailed for Germany to make an extended tour of Europe and the British Isles, in connection with the manufacture and distribution of the company's equipment abroad. Mr. Brosius will visit blast furnaces and steel plants in Germany, Belgium, Czechoslovakia, Austria, Italy, Spain, France, Holland, Switzerland, Luxemburg and the British Isles.

GEORGE E. J. PISTOR, of the Hay Foundry & Iron Works, and treasurer of the American Institute of Steel Construction, who has been in Europe during the past two months consulting with engineering organizations on the extension of markets for structural steel, will arrive at New York on Sept. 13.

RAY P. TARBELL, formerly Cleveland district sales manager of the Lincoln Electric Co., Cleveland, has become vice-president and secretary and a member of the firm of Robert E. Kinkead, Inc., consulting welding engineer, Cleveland. Mr. Tarbell has been associated with the Lincoln Electric Co. since 1918.

J. C. TEN EYCK, JR., has been appointed Eastern district sales manager, with headquarters in New York, for the W. F. & John S. Barnes Co., Rockford, Ill.

JAMES L. O'NEILL, formerly asso-

ciated with the Hyatt Bearing Division of the General Motors Corporation, has become production engineer of the William H. Jackson Co., Brooklyn, N. Y.

C. P. MILLS, for many years identified with the Duraloy Co., has been made director of the chrome alloy department of the General Alloys Co., Boston. He is a graduate of the engineering department of the University of Pennsylvania and spent several years in Government engineering construction before becoming associated with the Koppers Co. and later the Duraloy Co.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

FRANK L. DRIVER, SR., chairman of the board of the Driver-Harris Co., Harrison, N. J., died in Belgium on Aug. 26, where he had been residing for the past five years because of ill

CARL O. STERNAGLE, for many years associated with Poldi Steel Corporation of America as western sales manager, died suddenly at Chicago on Sept. 2.



Frank L. Driver, Sr.

WILLIAM L. TURNER, former partner in the Matthew Addy Co., pig iron and steel broker, Cincinnati, died of a heart attack at his home in that city on Sept. 2, aged 62 years. He was born in Cincinnati and began his business career as office boy for the Matthew Addy Co. When the founder of the firm died, he became a partner. Mr. Turner retired from active business in 1915.

FRANK I. FOOTE, for about 15 years a salesman in the Chicago office of Rogers, Brown & Co., now Rogers, Brown & Crocker Brothers, Inc., died Aug. 5 at his home in Chicago. He retired from active work about 10 years ago.

HARRY KIENZEL, of the Philadelphia office, Jones & Laughlin Steel Corporation, died Sept. 7. He was 51 years of age and had been with the company for the past 25 years, for many years traveling through the coal districts of Pennsylvania.

health. He was born in Brooklyn on July 4, 1870. Mr. Driver founded the company in 1899 and was president until 1925, when he retired to the chairmanship of the board.

FRED J. WEISS, formerly head of the Walker-Weiss Axle Co., Flint, Mich., died Sept. 1 at his home in that city at the age of 58. He was associated for many years with William C. Durant and J. Dallas Dort in early automobile manufacturing in Flint. In 1900 he became general manager of the Flint Axle Co., which made axles for the Durant-Dort Carriage Co., but later the name of the company was changed to the Walker-Weiss Axle Co. and the company shifted its activities into the automobile field. Mr. Weiss was prominently identified with the civic life of Flint.

More Locomotives Shipped in August

WASHINGTON, Sept. 8.—Shipments of railroad locomotives by manufacturers in August increased to 77 units from 56 in July, according to the Department of Commerce. Of the total shipped in August, 72 were steam locomotives, 68 for domestic and four for foreign account. The remaining five were electric locomotives for domestic account.

Total shipments of locomotives in the first eight months of 1930 exceeded by 35 units the total for the corresponding period of last year—552, compared with 517. Unfilled orders at the end of August totaled 234 locomotives, against 291 at the end of July. On Aug. 31, 1929, orders called for 436 units.

Encouraging Signs Appear

Inquiries for Machine
Tools Are More Numerous
But Volume of Buying Is Low

ENCOURAGING signs are appearing in the machine tool markets, but they are mostly in the form of inquiries rather than orders. The volume of buying is still extremely low, although the first week of September has given promise that this month's business may exceed that of August by at least a small margin.

Buyers are apparently in a mood to consider purchases if there is an appreciable improvement in general fall business. After receiving quotations, however, many of them still

hesitate about closing, possibly on the ground that their own orders have not improved to the extent hoped for.

Machine tool plants have recently been operated at low rates and few of them have accumulated stocks of finished tools. Therefore, any appreciable gain in orders would be quickly reflected in better shop operations.

High spots of pending business are the requirements of the American Locomotive Co., which, with the business recently placed for its subsidiary,

the McIntosh & Seymour Corporation, Auburn, N. Y., may total several hundred thousand dollars; a list for the Youngstown Sheet & Tube Co., on which quotations have gone in; 18 metal-working lathes for the Chicago Board of Education, and a list for the Oliver Farm Equipment Co., St. Charles, Iowa.

The Amtorg Trading Corporation, New York, has ordered 26 small lathes from a Cincinnati builder for shipment to Russia, and is expected to purchase a number of turret lathes.

New York

Machine tool business has taken on a slightly new spirit of activity since the first of the month, but the change is mostly in the form of inquiries rather than orders. While these inquiries come from companies which have not been interested in the purchase of new equipment, during the past few months, it is difficult even for the machine tool trade to estimate at this time how many of them may develop into orders. It appears that many companies are preparing for an improvement in business, but are not yet sure as to how soon it may come or how extensive it will be during the next few months.

Prospective orders of the American Locomotive Co. constitute the most important item of business development. It is said that the locomotive company has made a large appropriation for complete rehabilitation of its shops. Its total purchases may run into several hundred thousand dollars. Orders for the plant of the McIntosh & Seymour Corporation, Auburn, N. Y., have already been placed, as reported a week ago, and other business is to follow soon.

Chicago

Developments continue to point the way to a seasonal improvement in machine tool sales during the fall. Bids on a fair-sized list have been forwarded to the Youngstown Sheet & Tube Co. The Illinois Steel Co. has added a 24-in. x 12-ft. lathe, a motor-driven grinder and a radial drill to its pending list.

A local marine repair yard has purchased several items, and the Oliver Farm Equipment Co., St. Charles, Iowa, is buying against a list. The Chicago Board of Education will re-advertise for 18 metal-working lathes, but expects to place drill orders soon. One Western railroad has asked for preliminary figures for budgeting.

Cincinnati

Machine tool demand continues to drag. New inquiry also is slow, and buyers still hesitate to close following receipt of quotations. Production continues at less than 50 per cent of normal. One plant, which had been closed for 10 days, reopened this week, but another shutdown next week may occur. Other plants are curtailing operations to 28 and 32 hr. a week.

The Amtorg Trading Corporation placed an order with a local builder for 26 small lathes.

Cleveland

Sentiment in the machine tool market has improved although no gain is reported in orders or inquiries. A fair amount of business is in prospect, but this is being withheld until industrial conditions improve. While with a few exceptions plant operations have not increased, some manufacturers in metal-working lines report an improvement in inquiry. The Amtorg Trading Corporation, whose purchase of several turret lathes was reported last week, is expected shortly to make an addi-

tional purchase of a number of similar machines. Three or four machine tools are pending from the New York Central Railroad.

New England

Machine tool dealers are securing little new business and are centering activities on old prospects, which apparently are in no hurry to cover their requirements. Machine tool builders generally have a well assorted, although by no means excessive, stock so that any protracted buying movement might easily result in extended deliveries for a short period. The industry seems to be in a healthy position so far as stocks of finished tools are concerned. Used tool sales have fallen almost to the zero point. The lull in business has afforded the trade an opportunity to put houses and stocks in order. Dealers' stocks are well balanced. Small tool sales are picking up, although business is by no means active.

Pittsburgh

After one of the quietest months on record, machinery business in this territory has begun to show slight improvement. Inquiry has increased somewhat and buyers are showing more disposition to consider purchases which have been held up for some time. Large industrial companies apparently are going ahead with improvement programs and, although the railroads are not expected to depart from their restricted buying policies for some time, the prospect

for a fairly satisfactory fall business is not unfavorable.

The Jones & Laughlin Steel Corporation has not yet taken action on its requirements for its various plants.

umber of tools will be needed for 'ine shop for the city's new municipal airport under construction. The St. Joseph Lead Co. will also require a substantial amount of tools and other equipment new plant being erected near Monaca Pa.

Milwaukee

Signs of encouragement pointing to more active machine tool business are appearing with greater frequency, and while sales volume remains restricted, enough new business is coming to sustain production at or somewhat above the average of recent months. Inquiry from automotive industries has improved appreciably, but it is doubtful when action will be taken, as purchases in a large measure will depend upon actual needs. Meanwhile, considerable replacement business is passing.

New York

GENERAL ELECTRIC CO., Schenectady, N. Y., has awarded general contract to Austin Co., Cleveland, for three-story and basement addition to branch plant at Fort Wayne, Ind., to cost \$200,000 with equipment.

Rubsam & Horrmann Brewing Co., 191 Canal Street, Stapleton, S. I., plans rebuilding five-story ice-manufacturing plant and adjoining two-story beverage plant destroyed by fire Sept. 4, with loss over \$500,000 with machinery.

In connection with expansion to cost \$5,878,340, New York Telephone Co., 140 West Street, has authorized installation of a new service and repair department in telephone building on West Fiftieth Street. Company engineering department will be in charge.

R. W. Cramer & Co., Inc., 136 Liberty Street, New York, precision instruments and equipment, has leased a floor in building at 67-69 Irving Place for distributing plant and headquarters.

Container Corporation of America, Inc., 111 West Washington Street, Chicago, manufacturer of paperboard, corrugated and other containers, has purchased plant and business of Gibraltar Corrugated Paper Box Co., North Bergen, N. J., comprising about two and one-half acres of floor space. Acquired company will be operated as Gibraltar Division of Container Corporation. Sefton Division of purchasing company, 882 Third Avenue, Brooklyn, will be removed to Gibraltar factory, where production will be concentrated. Philadelphia plant of parent organization at Nixon and Fountain Streets will be developed for corrugated paperboard supply for Gibraltar mill. Latter plant will continue in charge of Samuel Katz and C. M. Thorson, heretofore president and vice-president, respectively, of Gibraltar company. With this acquisition, Container Corporation is operating 19 plants in different parts of country.

United States Army Aviation Post, Mitchel Field, L. I., Lieut.-Col. John H. Howard, commandant, plans rebuilding machine shops, storage buildings and other field units destroyed by fire Sept. 4, with loss over \$100,000 including equipment.

Citiles Service Co., 60 Wall Street, New York, is negotiating for purchase of Louisiana Oil Refining Corporation, operating two main refineries at Shreveport, La., with daily capacity of about 17,000 bbl., and group of oil storage and distributing

plants in Louisiana, Arkansas and Mississippi. Purchasing company will consolidate with organization and proposes to carry out expansion in district noted, in addition to natural gas development.

Board of Education, Manasquan, N. J., plans installation of manual training equipment in new three-story and basement high school, to cost about \$250,000, for which plans will be drawn by Coffin & Coffin, 522 Fifth Avenue, New York, architects.

Bergen Square Garage Co., Jersey City, N. J., care of Charles Shilowitz, 26 Journal Square, architect, has awarded a general contract to Fisher-Williams Corporation, 110 East Forty-second Street, New York, for a five-story automobile service, repair and garage building, to cost over \$400,000 with equipment.

Bayway Terminal, Inc., Bayway, Elizabeth, N. J., has purchased Elizabeth, N. J., plant of Durant Motors, Inc., 250 West Fifty-seventh Street, New York, formerly used for production of Star automobile. Structure is of multi-story type, with electric generating station of 10,000-hp. capacity, and will be used in part for a new terminal for storage and distribution by purchasing company. It is understood that part of building will be leased to outside manufacturing interests.

Public Service Electric & Gas Co., Terminal Building, Newark, has secured riparian rights for property on Raritan River, near Sewaren, N. J., and is contemplating super-power steam-operated electric generating plant at that place, with ultimate cost more than \$10,000,000 including steel tower transmission line.

General Equipment & Supply Co., 9 Clinton Street, Newark, bolts, nuts, screws and kindred hardware specialties, has leased two-story factory at 33 Bruen Street for a new storage and distributing plant.

Board of Education, Hillsdale, N. J.,

INDUSTRIAL ACTIVITY

Prospects as Revealed by a Survey of Construction Projects

NOT counting \$80,000,000 for seven gigantic enterprises freshly appearing in the power and oil fields, new business in machinery and factory equipment lines was closed or was put under negotiation in the past week for 79 companies for a total overall expenditure in excess of \$20,000,000.

The oil industry accounted for \$5,500,000—for five natural gas lines, for four local oil storage and distribution systems and for a refinery. The pipe lines included one from Kansas to Colorado Springs, one in Florida, a Humble Oil line in Texas and one from Pennsylvania to Washington and Baltimore. Not counted in the foregoing was \$30,000,000 for an Ashland, Ky.-Detroit line, a Gulf Oil refinery at Neville Island, Pittsburgh, and a Pure Oil refinery at Toledo.

Twelve new power developments, nine for public utilities, aggregated \$2,700,000, and in addition were \$50,000,000 for a contemplated station near

Sewaren, N. J., a hydroelectric plant at Safe Harbor on the Susquehanna River, and two Electric Bond & Share proposals, one on Susquehanna near Sunbury, Pa.; one on Salt River, Arizona.

The automotive industry contributed \$3,600,000 in one public garage and in five airports, including \$3,000,000 for San Francisco, subject to ratification by the voters of the city.

There were six manual training schools in the week's items, calling for \$2,600,000, \$1,000,000 of which is for San Antonio.

Among 45 various industrial plants, involving in all \$4,900,000, were an A. O. Smith and a Crane plant for Milwaukee, shops for the Jackson, Mich., prison, three large refrigerating plants and General Electric extensions at Fort Wayne.

Industrial building work demanding equipment chiefly for machining operations showed a total of \$900,000 for 16 companies.

is considering installation of manual training equipment in new junior high school to cost over \$200,000, for which plans will be drawn by Hacker & Hacker, 201 Main Street, Fort Lee, N. J., architects.

Anthony Kaminsky, 194 Malvern Street, Newark, operating a machine shop, has filed plans for a new one-story works at 34 Oxford Street, to cost over \$25,000 with equipment. Present plant will be removed to new location and capacity increased.

Shell Eastern Petroleum Products Co., 122 East Forty-second Street, New York, has work under way on a new oil storage and distributing plant at Sewaren, N. J., with main unit, 178 x 432 ft., to include a power house, machine shop and other structures, to cost over \$150,000 with equipment. General contract has been let to Cross & Roberts, Inc., Statler Building, Boston. H. S. Bell, 233 Broadway, New York, is engineer.

Van Gytenbeek Mfg. Co., Inc., 81 Warren Street, Newark, manufacturer of advertising novelties, has leased a floor in building at Bruen and Hamilton Streets for expansion.

Boiler Engineering Co., Newark, N. J., has become affiliated with Plibrico Jointless Firebrick Co., Chicago, manufacturer of Plibrico furnace lining. Boiler Engineering Co. will continue to maintain headquarters at Newark. Main offices of Plibrico Jointless Firebrick Co. will remain in Chicago.

New England

PLANS are under way by New Haven Airport, New Haven, Conn., for hangar unit, 80 x 100 ft., with two lean-to extensions, 20 x 100 ft. and 20 x 50 ft., at Morris Cove Airport, with repair and reconditioning facilities, to cost over \$35,000 with equipment. Leo F. Caproni & Co., 1044 Chapel Street, are architects.

J. A. Hill, 90 Pond Street, Natick, Mass., has plans for one-story artificial ice-manufacturing plant, to cost over \$50,000 with machinery. C. Charles Coneby, 1580 Ansel Road, Cleveland, is engineer.

Tullane Auto Body Repair Co., Inc., Quincy, Mass., has been organized to take over and expand Tullane, Inc., with works at 435 Adams Street. John Di Tullio is president of new company, and Herbert W. Lane, treasurer.

Fridgite Corporation, Clinton, Mass., recently formed with capital of \$500,000, has taken over former mill of Thayer, Bradley & Co., Water Street, and begun production of self-contained electric refrigerating cabinets. Charles I. Sherman is manager.

Board of Education, Hartford, Conn., has authorized installation of manual training department in new William T. Sedgwick junior high school, to cost over \$400,000, for which bids will soon be asked on general contract. Russell F. Barker, Hartford, is architect.

Anchor Color & Gum Works, Inc., Dighton, Mass., has plans for a power plant, to cost about \$45,000 with equipment. E. I. Marvell, 290 Bedford Street, Fall River, Mass., is architect.

New England Power Associates, Boston, are inquiring for a 250-ton electric crane for a hydroelectric development project.

Public Works Department, Boston, is in market for bridge machinery and electrical equipment.

Condit Electric Mfg. Co., Hyde Park

district, Boston, has plans for a two-story addition.

Maine Coal & Dock Co., Bucksport, Me., will ask bids this month on coal pockets and handling equipment to replace plant recently damaged by fire.

United Electric Light Co., Springfield, Mass., is taking bids on a coal handling plant. Conveyors and miscellaneous equipment will be required.

Berst-Forster, Dixfield Co., Peru, Me., manufacturer of wood novelties, etc., has awarded general contract for a one-story plant, 150 x 150 ft. Mechanical equipment and motors of various sizes will be purchased.

Philadelphia

TITLE to seven-story factory at Oxford and Marvine streets, 155 x 173 ft., for expansion, has been taken by Ebert Motor Truck Co., Twenty-fourth and Brown Streets, Philadelphia, manufacturer of motor trucks. It is understood that present works will be removed to new location.

Acme Iron Works, Inc., Philadelphia, has been organized with capital of \$20,000 to take over and expand company of same name with plant at 2619 West York Street. New organization will specialize in structural and ornamental iron work, and is headed by Leon J. Fishman, Harry Axelrod and Frank Ranzin.

Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has awarded general contract to United Engineers & Constructors, Inc., 112 North Broad Street, for new power plant, to cost over \$75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Sept. 23 for one motor-driven drilling machine and one electric vibrating machine for Philadelphia navy yard.

Old Guard Lubricant, Inc., Philadelphia, has filed plans for a new one-story oil and lubricant manufacturing plant at Lindberg Boulevard and Seventy-second Street, for which building contract recently was let to Beers-Tapman, Inc., 15 Park Row, New York, to cost about \$27,000 with equipment.

James A. Stone, 6432 Limekiln Pike, Philadelphia, and associates have organized Home Stoker Co. to operate a local plant for manufacture of stokers and stoker mechanisms for domestic heaters and furnaces. Mr. Stone will be treasurer; R. Dexter Warriner, Villa Nova, Pa., is interested in new company.

City Commission, City Hall, Trenton, N. J., Albert G. Howell, acting city clerk, is asking bids until Sept. 19 for a 220-kw. rotary converter, with switchboards, transformers, etc.; also for an a. c. current switchboard. Specifications on file at office of Engineering Department, Department of Public Works, Trenton.

Crane Co., 336 South Michigan Avenue, Chicago, has acquired property at Wilmington, Del., for new two-story factory branch and distributing plant, 94 x 142 ft., to cost over \$75,000 with equipment. A pipe-fitting and other mechanical departments will be provided. Clarence R. Hope, du Pont Building, Wilmington, is architect.

E. S. Quigley, State House, Trenton, N. J., State purchasing agent, is asking bids until Sept. 18 for a motor-driven extractor.

Gray Iron Foundry & Mfg. Co., Reading, Pa., has been formed with capital of \$25,000 to take over plant and business

of Gray Iron Foundry Co., West Green and Tulpehocken streets, and will specialize in castings as well as machine products and metal goods.

Pennsylvania Power & Light Co., Allentown, Pa., has acquired Boyer's Island in Susquehanna River, near Sunbury, Pa., consisting of 200 acres, as well as property at Hummel's Wharf in same vicinity, and is considering new super-power hydroelectric generating station with steel tower transmission line to anthracite coal regions for industrial power, to cost over \$15,000,000. Company is an interest of Electric Bond & Share Co., 2 Rector Street, New York.

South Atlantic

PLANS for construction of pipe line from Pennsylvania to Washington, Baltimore and vicinity, for natural gas supply, with booster pressure stations, etc., is contemplated by Maryland Gas Transmission Corporation, Baltimore, care of Francis J. Carey, Baltimore Trust Building, attorney, recently organized. Project will cost over \$2,000,000.

Enterprise Mill, Inc., Pittsboro, N. C., recently organized by S. E. Barbour, Pittsboro, and associates, with capital of \$100,000, is considering construction of new cottonseed oil mill, to cost over \$50,000 with machinery. J. D. Barbour, Clayton, N. C., is interested in company.

Safe Harbor Water Power Corporation, Lexington Building, Baltimore, affiliated with Pennsylvania Water & Power Co., same address, has work under way on power dam for hydroelectric power project at Safe Harbor on Susquehanna River. New hydroelectric development will cost about \$25,000,000 including steel tower transmission lines. Company engineering department is in charge.

General Purchasing Officer, Panama Canal, Washington, will receive bids until Sept. 19 for quantity of machine screws, cap screws, machine bolts, carriage bolts, washers, two gasoline engine-driven pumps and other mechanical equipment.

Toccoa Electric Power Co., Blue Ridge, Ga., operated by Tennessee Electric Power Co., Chattanooga, Tenn., has plans for a new power house, to cost about \$90,000 with machinery.

Following recent acquisition of Stewart Brothers Paint Co., Spartanburg, S. C., by C. W. Bartleson, Jr., and associates, and change of name to Stewart-Bartleson Paint Co., plans are under way for expansion, with installation of additional machinery. Mr. Bartleson heads company.

City Council, Norfolk, Va., is considering electrification of municipal water pumping plant at Suffolk, Va.

Virginia Gas & Utilities Co., Pulaski, Va., operated by Atlantic Gas Co., Lewis Building, Philadelphia, has plans for erection of two new artificial gas-manufacturing plants at Pulaski and Radford, Va., to cost over \$100,000 with equipment.

Silver-X-Bearing Co., Newberry, S. C., operating a mechanical works for connecting rods, main bearings and kindred equipment, including repair plant, is considering removal to 155 South Liberty Street, Spartanburg, S. C., for expansion.

Carolina Power & Light Co., Raleigh, N. C., has acquired plant and properties of Haywood Electric Co., Lake Junaluska, N. C., and vicinity, and will consolidate. Expansion will be carried out, including installation of additional equipment.

Buffalo

BUFFALO PIPE & FOUNDRY CO., 9 Austin Street, Buffalo, recently formed by Frank B. Baird and associates, has taken over part of former local Arco plant of American Radiator Co., and will remodel for production of cast iron pipe and kindred products. Adjoining property has also been acquired for immediate erection of one-story addition to main existing unit. Mr. Baird, who will be president of new company, has been identified with iron industry for many years. Cameron and William Baird, sons of Frank B. Baird, will be officers of new company.

International Milling Co., 120 Childs Street, Buffalo, with main offices at Minneapolis, operating flour and grain mills, has awarded a general contract to Jones & Hettelsater Co., Kansas City, Mo., for grain elevator addition, to cost over \$350,000 with elevating, conveying, screening and other machinery. J. J. Koverick is vice-president in charge of operations at Buffalo.

Harold L. Schultz, Phoenix, N. Y., and associates have organized Schultz Appliance Corporation, with capital of \$50,000 and 300 shares of stock, no par value, and plan early operation of factory at Syracuse, N. Y., for manufacture of industrial furnaces and appliances. Willard R. Rich, State Tower Building, Syracuse, is interested in new company.

Buffalo Foundry Co., Norfolk and East Delavan Avenues, Buffalo, plans rebuilding part of plant recently destroyed by fire, with loss about \$35,000 including equipment.

Following recent affiliation of interest with Berg-Winship, Inc., 1900 Bleeker Street, Utica, N. Y., Grand Chromium Plating Corporation, Thompson Avenue, Long Island City, N. Y., has begun erection of new plant for chromium plating at Utica, using site of company first noted, to cost over \$25,000, and will operate as branch. Mathias David, president of Grand Chromium company, will be in charge of production at Utica.

Pittsburgh

CONTRACT has been let by Fort Pitt Steel Casting Co., Houghton Avenue, McKeesport, Pa., to Blair & Mack Co., 920 Market Street, for two-story addition, 31 x 70 ft., for storage and distribution, to cost about \$35,000 with equipment.

Burton Explosives, Inc., Guardian Building, Cleveland, J. S. Burton, president and general manager, has taken over 400 acres near New Castle, Pa., formerly occupied by Grasselli Powder Co. Work will begin on new plant for initial output of 1,000,000 lb. of explosives monthly. Later, Burton company proposes to develop part of tract for plant for manufacture of heavy chemicals. Entire project will cost over \$100,000.

City Council, Ford City, Pa., has plans for a municipal electric light and power house, to cost over \$75,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

School District of Robinson Township, care of J. C. Mortimer, secretary, R. D. 1, McKees Rocks, Pa., is asking bids until Sept. 17 for deep-well pumping machinery and auxiliary equipment.

Gulf Refining Co., Frick Annex, Pitts-

burgh, affiliated with Gulf Oil Corporation, same address, has work under way on new oil refinery on Neville Island where 120 acres was recently acquired. A unit for gasoline production will be installed, with gas compression house, boiler plant, machine shop, loading platforms. Storage and distributing plant of 450,000 bbl. capacity will be provided. Entire project will cost about \$4,500,000 with equipment.

Detroit

FOLLOWING recent acquisition of National Appliance Co., Jackson, manufacturer of flood-lighting equipment, a subsidiary of Reynolds Spring Co., same address, by Appleton Electric Co., 1713 Wellington Street, Chicago, plans are under way for removal of plant and business to Chicago, where production will be increased and concentrated.

Carroll Steel Foundry Co., Houghton, contemplates a new one-story foundry unit, to cost over \$35,000 with equipment.

Pressed Metals of America, Inc., Marysville, is arranging to expand output with production of a new line of pressed metal plumbing fixtures.

Board of Water Commissioners, 735 Randolph Street, Detroit, is asking bids until Sept. 23 for a motor-driven centrifugal pumping unit with daily capacity of 17,000,000 gal. for booster plant on West Warren Avenue. George H. Fenkell is general manager and chief engineer.

Hope Engineering Co., Mount Vernon, Ohio, affiliated with Moody-Seagraves Corporation, Fort Worth, Tex., has surveys under way for a pipe line for natural gas service at Detroit and vicinity. Line will run from point near Ashland, Ky., and is expected to be started within next 60 to 90 days, to cost over \$20,000,000 with booster stations and other equipment. Hope company will be in charge of project.

Board of Trustees, University of Detroit, Detroit, has plans for a power house in connection with two new institutional buildings, entire project to cost about \$600,000. Malcolmson, Higginbotham & Trout, 1217 Griswold Street, are architects and engineers.

State Prison Commission, Lansing, has approved a building program at State prison at Jackson, to cost \$556,000, and work has been placed under way. New industrial school buildings will be built to cost about \$100,000 with equipment, and extensions made in power plant, with installation of additional machinery.

Seneca Copper Co., Calumet, is arranging an expansion program at its No. 1 shaft, including construction of new rockhouse, installation of compressors, sorting belts, and other equipment.

Chicago

BIDS have been asked on general contract by Nehring Electrical Works, Inc., DeKalb, Ill., manufacturer of electrical equipment, for one-story addition, 236 x 360 ft., to cost over \$100,000 with equipment; part of unit will be 137 x 155 ft.

North Shore Petroleum Co., 5937 Rogers Avenue, Chicago, has acquired about 30,000 sq. ft. of land on Eighty-ninth Place, near State Street, as site for a new oil storage and distributing plant, to cost about \$70,000 with equipment.

Arthur K. Lee, 27-31 Independence

Building, Colorado Springs, Colo., is at head of project to construct a natural gas pipe line from point in Stevens County, Kan., to Colorado Springs and vicinity, to cost over \$1,000,000 with booster stations and other operating equipment.

Iowa Soap Co., Burlington, Iowa, has purchased property on Valley Street, and plans erection of addition, to cost about \$115,000 with equipment.

W. B. & Leo Harris, 2429 University Avenue, S. E., Minneapolis, machinery and equipment, will soon take bids for a one and two-story and basement equipment storage and distributing plant, to cost about \$60,000. Sund & Dunham, Essex Building, are architects. Leo Harris is one of heads of company in charge.

Northwest Paper Co., Cloquet, Minn., is planning to rebuild part of mill B, recently destroyed by fire, with loss over \$100,000 including machinery. Company has work in progress on expansion program, consisting of main one-story unit, 125 x 725 ft., for which general contract recently was let to James Leck Co., Minneapolis, to cost over \$400,000 with equipment. Jacobson Engineering Co., Plymouth Building, Minneapolis, is engineer.

Bureau of Reclamation, Denver, is asking bids until Sept. 23 for one 5000-kva. generator unit, transformers, gang-operated electric switches, switchboard and auxiliary apparatus for Shoshone power plant.

Perry Coal Co., Belleville, Ill., is planning to rebuild steel tippie and other structures recently destroyed by fire, with loss over \$130,000. D. W. Green, O'Fallon, Ill., is architect.

Cities Service Oil Co., Grand Forks, N. D., is planning construction of two-story and basement oil storage and distributing plant, 80 x 160 ft., to cost about \$55,000 with equipment. Theodore B. Wells, First National Bank Building, is architect.

American Can Co., 104 South Michigan Avenue, Chicago, will build a one-story boiler room and an addition to warehouse, 58 x 94 ft., at 6007 South Western Avenue.

Cleveland

CONSTRUCTION of a new oil refinery on Maumee River, Toledo, is planned by Pure Oil Co., 35 East Wacker Drive, Cleveland, in conjunction with Hickok Oil Corporation, 2313 Madison Avenue, Toledo, to cost about \$5,000,000 with machinery. Project will include pipe line for gasoline service at Detroit, Cleveland and other distributing centers, to cost about \$15,000,000 additional.

Corundite Refractories, Inc., Massillon, Ohio, manufacturer of high temperature refractories, has plans for an addition, including tunnel kiln unit, to cost about \$75,000 with equipment.

Master Builders' Co., East Seventy-first Street and Euclid Avenue, Cleveland, manufacturer of concrete hardeners, waterproofing specialties and kindred products, has leased property at Toronto, Ont., for a subsidiary plant at that place.

Garfield Tool & Die Corporation, East Palestine, Ohio, has been formed to take over and operate Garfield Tool & Die Co., Garfield, Ohio, which has recently leased property at East Palestine and will remove plant to that place. H. L. McCarthy and J. H. Campbell are incorporators of new company.

Great Lakes Aircraft Corporation, 16800 St. Clair Avenue, Cleveland, a subsidiary of Allied Motor Industries, Inc., is arranging for increased production following receipt of order from United States Navy Department for a number of naval aircraft. Company is operating at former plant of Glenn L. Martin Co. B. F. Castle is president.

Milwaukee

CONSTRUCTION has been started by A. O. Smith Corporation, Milwaukee, on a new plant unit to cost \$400,000. Structure will be 225 x 245 ft., 100 ft. high, designated as Building No. 108. Worden-Allen Co., Milwaukee, is general contractor.

Newport Co., Carrollville, Milwaukee County, Wis., manufacturer of chemicals, dyestuffs, etc., has plans by Fitzhugh Scott, architect, 214 Mason Street, Milwaukee, for a four-story addition, 140 x 220 ft., to cost about \$250,000. Contracts will be placed this week and work started immediately.

Crane Co., Chicago, has placed general contract with W. W. Oefflein, Inc., 110 East Wisconsin Avenue, Milwaukee, for new Milwaukee branch plant costing \$250,000.

Triplex Lawn Mower Co., Platteville, Wis., manufacturer of power and manual lawn mowers with quickly adjustable blade feature, has disposed of its business to White Machinery Co., Eau Claire. Entire operation is being transferred to Eau Claire and Platteville plant is being abandoned.

Village of Randolph, Wis., D. B. Davis, clerk, is taking bids until Sept. 19 for pumping plant and equipment for new waterworks system costing about \$50,000. Items include one 300-gal. per min. engine-driven centrifugal pump, one single-stage 110-ft. compressor and one 6-in. turbine water meter. Project is in charge of W. G. Kirchoffer, consulting engineer, Madison, Wis.

Cincinnati

GENERAL contract has been awarded by Boye & Emmes Machine Tool Co., Cincinnati, to Austin Co., Cleveland, for a one-story plant, 120 x 260 ft., on Caldwell Drive, Hartwell. Contract includes installation of a 6-ton traveling crane.

Grimm Iron Works, 2431 Spring Grove Avenue, Cincinnati, has awarded general contract to Edward Honnert, Mount Airy, for new one-story plant, 80 x 172 ft., to cost about \$60,000 with equipment.

Duberstein Iron & Metal Co., 953 Washington Street, Dayton, Ohio, has awarded contract to Charles Dumbley, Dayton, for a one-story addition for storage and distribution.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until Sept. 18 for following equipment, most of which is motor driven: One precision surfacer, one electric molder, one band saw, four multiplex saws, one knife grinder, two wood shapers, one flexible belt sander, one planer and jointer, one electric saw, one miter and bevel saw, one wood shaper, two hand planers and jointers, one boring machine, one surfacer, one combination automatic band, rip and edging saw, and one variety saw; until Sept. 15, one milling machine, one planer, one power-feed hollow chisel, motor-in-head type, mortiser and one tenoner; until Sept. 17,

one jig boring machine, and on Sept. 22 for two motor-generator sets.

Southern Coal & Coke Co., Holston Bank Building, Knoxville, Tenn., has acquired about 300 acres of coal properties of Black Diamond Coal Co., near Coal Creek, Tenn., and plans expansion, including a new tippie, mining and surface equipment, to cost over \$125,000.

Memphis Natural Gas Co., Commercial Bank Building, Memphis, Tenn., D. C. Shaffer, general manager, has plans for new natural gas pipe line, connecting with main Louisiana-Tennessee line, extending to different points in Mississippi, about 50 miles, to cost about \$100,000 with equipment.

General Iron Works Co., 1221 Front Street, Cincinnati, is discontinuing its structural steel fabricating department and will give over plant to production of special heating systems and equipment, including present Hot-Kold heating systems and apparatus.

Memphis Power & Light Co., Memphis, Tenn., has acquired about 1600 acres south of city limits, for new steam-operated electric generating plant, to cost about \$1,000,000 with transmission system. Company engineering department will be in charge.

Bissett Steel Co., Cincinnati, has moved into its new warehouse at Sixth and Evans Streets. H. W. Diehl is manager.

Indiana

ORTON CRANE & SHOVEL CO., Huntington, manufacturer of locomotive cranes, clamshell buckets, crawler cranes, etc., is considering an expansion, including additional buildings on adjoining site, to cost over \$75,000.

Powercraft Motors Corporation, Anderson, manufacturer of gasoline engines, parts, etc., has taken over local plant of Anderson Carriage Works, and will remodel for new plant, to cost about \$50,000.

Mead-Johnson Co., St. Joseph Avenue, Evansville, manufacturer of prepared foods, is at head of project to construct a local rail and river terminal at foot of Ninth Avenue, to include elevating, conveying, loading and other mechanical-handling equipment, to cost about \$300,000. M. J. Hoffman Construction Co., Furniture Building, is engineer.

Officials of Bendix Corporation, South Bend, have organized Bendix Research Corporation to engage in research and experimental work for parent company and 26 subsidiary organizations, specializing in production of aircraft, automobile and marine motor equipment and accessories. Main experimental plant will be at 545 North Arlington Avenue, East Orange, N. J.

Board of Trustees, School for Feeble-Minded, Butlerville, is asking bids until Sept. 20 for a new power plant, including equipment, to cost about \$50,000. O. B. Little, 307 North Illinois Street, Indianapolis, is architect and engineer.

Gulf States

CONSTRUCTION of new pipe line for natural gas service at Pensacola, Fla., has been authorized by Southern Natural Gas Corporation, Watts Building, Birmingham, beginning near Mobile, Ala., about 67 miles, to cost \$1,000,000 with booster plants and other equipment. Work will be carried out by Natural Gas

Engineering Corporation, same address as affiliated organization. Distribution at Pensacola will be provided by Florida Public Utilities Co., South Palafox Street, Pensacola.

Board of Education, San Antonio, Tex., plans installation of manual training equipment in new high school group in Spanish Acres district, to cost about \$1,000,000, for which bids have been asked on general contract.

Universal Gas Co., New Merchant Bank Building, Jackson, Miss., is planning installation of a plant for production of carbon black and contemplates purchase of air compressors and other equipment. Oakes Brown is one of heads of company in charge.

Southern Air Transport, Inc., Love Field, Dallas, Tex., has plans for a new hangar unit with repair and reconditioning facilities, to cost \$100,000 with equipment.

New Orleans Public Service Co., Baronne and Union Streets, New Orleans, has awarded general contract to J. A. Petty & Sons, Inc., Audubon Building, for a one and one-half story repair shop and rolling stock building, 35 x 150 ft., to cost over \$40,000 with equipment. Company engineering department is in charge.

Texas Ice & Refrigerating Co., Fort Worth, Tex., has plans for extensions and improvements in ice-manufacturing plant in connection with a new fruit and produce terminal, including cold storage facilities, conveying and other mechanical-handling equipment, to cost about \$300,000.

Standard Oil Co. of Louisiana, Inc., 2134 St. Charles Avenue, New Orleans, is planning a new oil storage and distributing plant for central Gulf terminal at Mobile, Ala., to cost about \$500,000 with equipment.

Alabama Coca-Cola Bottling Co., Anniston, Ala., has awarded general contract to Duke-Stickney Construction Co., Liles Building, for new two-story and basement bottling plant, to cost about \$85,000 with automatic bottling, conveying and other equipment.

Hughes Tool Co., Houston, Tex., manufacturer of oil well machinery and equipment, is completing new plant at Midland, Tex., to cost about \$150,000.

Panhandle Power & Light Co., Borger, Tex., has work under way on a new steam-operated electric generating plant at Mobeetie, Tex., for service in Panhandle oilfield territory, to cost about \$300,000 with transmission system.

Humble Pipe Line Co., Houston, Tex., operated by Humble Oil & Refining Co., same address, has plans for new pipe line from Pettus oilfield to Refugio, Tex., where connection will be made with line running to refinery of parent company at Ingleside, to cost over \$450,000.

Riverside Sand, Gravel & Crushed Stone Co., Amarillo, Tex., W. L. Slayden, head, is planning installation of a new plant for capacity of about 35 cars of crushed stone a day. Installation will include elevating, conveying, crushing and other machinery, dragline bucket about 1½ yd. capacity, and a 50-ton industrial locomotive.

Foote Brothers Gear & Machine Co., 111 North Canal Street, Chicago, has recently appointed J. L. Hart Machinery Co., South Florida and Eunice Avenues, Tampa, Fla., representative in Florida, south of a line east and west across State from Centralia to Titusville.

St. Louis

GENERAL contract has been awarded to McCormack-Combs Construction Co., Columbia Building, by St. Louis Refrigerating & Cold Storage Co., 1300 Lewis Street, St. Louis, for a two-story cold storage and refrigerating plant, 65 x 70 ft., to cost over \$50,000 with machinery.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., will proceed with superstructure for a new two-story and basement steam-operated electric power plant, 140 x 186 ft., to cost about \$250,000 with equipment. Company engineering department is in charge.

City Council, Lawton, Okla., will install a 50,000-gal. steel tank on steel tower in connection with an expansion program for municipal waterworks, to cost over \$500,000. Bids will be asked for equipment in 30 to 60 days. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Phillips Petroleum Co., Bartlesville, Okla., and Independent Oil & Gas Co., Tulsa, Okla., have arranged for a merger, with gross assets of \$165,768,000. Consolidated company will operate three main oil refineries and 54 natural gasoline plants with daily output of about 1,000,000 gal., as well as oil storage and distributing plants in different localities. Phillips company has plans for a new gasoline refinery near Hobbs, N. M., to cost over \$150,000 with machinery. Phillips Pipe Line Co., a subsidiary, has recently begun work on a new gasoline pipe line from Borger, Tex., to St. Louis, to cost about \$10,000,000.

Joplin Gas Co., 218 West Fourth Street, Joplin, Mo., will soon begin superstructure for a one-story and basement equipment storage and distributing plant, 50 x 100 ft., to cost about \$40,000, for which general contract recently was let to Dieter Construction Co., Independent Building.

City Council, Vinita, Okla., is considering a municipal electric light and power plant, to cost about \$90,000 with machinery. F. C. Cowell, Vinita, is engineer.

Board of Education, Ferguson, Mo., plans installation of manual training equipment in new high school to cost over \$400,000, bids for initial unit to be asked at once. William B. Ittner, Inc., Continental Life Building, St. Louis, is architect.

Mid-Continent Oil Well Tool Co., Tuloma Building, Tulsa, Okla., has plans for initial unit of new plant for manufacture of oil well drilling tools, one story, 40 x 145 ft., to cost about \$50,000 with equipment. Structure will be used primarily as a machine shop; other units will be built later.

Nathan L. Jones, Salina, Kan., president, Western Power, Light & Telephone Co., and other utilities, with associates has organized Power, Light & Service Co., with capital of \$25,000,000, to take over and operate utility company noted and other properties. New company has acquired American Service Co., operating 93 ice-manufacturing, cold storage and refrigerating plants at different localities, and will carry out general expansion.

Pacific Coast

A ONE-STORY addition is planned by Public Service Brass Corporation, 2901 East Slauson Avenue, Huntington Park, Cal., to cost close to \$30,000 including equipment.

Donald Uhl, California Bank Building, Beverly Hills, Cal., architect, has plans for a one-story machine shop, 75 x 210 ft., at Los Angeles, owner's name temporarily withheld, to cost about \$35,000 with equipment.

Central Arizona Light & Power Co., Phoenix, Ariz., is planning a hydroelectric generating plant on Salt River above Roosevelt Dam, with steel tower transmission line to Globe-Miami, Ariz., mining district, to cost over \$2,000,000. Company is affiliated with Electric Bond & Share Co., 2 Rector Street, New York. United Copper Co., Globe, Ariz., is interested in project.

City Council, Stockton, Cal., has plans for a new hangar at municipal airport with repair and reconditioning facilities, to cost over \$40,000 with equipment. Lyle Payton, City Hall, is city engineer.

Board of Education, Los Angeles, will build a one-story vocational training shop, 70 x 160 ft., at new Marshall high school group to cost about \$380,000, for which bids have been asked on general contract. Plans on file at office of board, Chamber of Commerce Building, William A. Sheldon, secretary.

Board of County Supervisors, San Francisco, is arranging a fund of \$4,000,000 for Mills Field Municipal Airport, of which about \$3,000,000 will be used for development, including new hangars, shop units and other field structures. Approval of citizens will be asked at general November election.

Portland General Electric Co., Portland, has been organized to take over and expand electric power properties of Pacific Northwest Public Service Co., operating at Portland, Salem and other points in Oregon and at Vancouver, Wash. Work is under way on a hydroelectric power development for a capacity of 38,000 hp. and new transmission lines. Acquiring company has arranged for sale of a bond issue of \$40,000,000, part of fund to be used for property acquisitions and expansion. Franklin T. Griffith, heretofore president of Pacific Northwest company, will act in same capacity with new organization.

Port Commission, Olympia, Wash., Ernest Gribble, manager, is planning erection of a municipal ice-manufacturing and cold storage plant, initial unit to cost about \$100,000 including equipment. Other units will be built later to cost more than \$200,000.

Dana Point Aeronautical Institute, Dana Point, Cal., has plans for new airport buildings at local field, including hangar with repair facilities, administration building and other structures, to cost about \$75,000 with equipment. S. H. Woodruff, 3043 Wilshire Boulevard, Los Angeles, is architect.

Baker Oil Tool Co., 2959 East Slauson Avenue, Huntington Park, Cal., manufacturer oil well tools and equipment, has plans for a one-story addition, 65 x 116 ft., to cost about \$45,000 with equipment. A traveling crane will be installed.

Standard Oil Co. of California has placed a contract with Austin Co., Cleveland, for nine service stations to be located in Los Angeles and suburbs.

Le Tourneau Mfg. Co., Stockton, Cal., has added 15 to its day force and has put on a night crew. Increase was made necessary to take care of orders for Le Tourneau line of heavy earth-moving machinery. Sufficient work is in sight to keep plant busy until January.

Canada

BIDS will be called soon for erection of several buildings at plant of Eugene F. Phillips, Ltd., Brockville, Ont. J. M. Miller, 648 Dorchester Street, Montreal, is architect.

Fraser Brace Engineering Co., Ltd., 107 Craig Street West, Montreal, has been awarded contract for \$70,000 alteration and addition to plant of International Nickel Co. of Canada, Ltd., at Copper Cliff, Ont. When completed this end of company's business will be transferred from Port Colborne, Ont., to Copper Cliff.

Taylor Electric Co., 526 Adelaide Street West, London, Ont., has awarded contract to Peterborough Construction Co. for one-story addition, 40 x 100 ft., to cost \$10,000. Watt & Blackwell, 288 Dundas Street, are architects.

Foreign

PLANs have been approved by British Eagle Oil Co., Mexico City, Mexico, known locally as El Agulla Co., for construction of crude oil pipe line from Furbero Oilfield, State of Vera Cruz, to Mexico City, about 140 miles, to cost over \$2,000,000. Connection will be made with Tampico Oilfield, where company will secure main source of supply. Installation will be in charge of Ingenieros e Contrapistas Martin, S. A., a Mexican subsidiary of James F. Martin Corporation, 25 Broadway, New York, and will include construction of electric-operated pumping plants for pumping oil through line over high altitudes. Company will begin construction soon of oil refinery in Mexico City, with division for gasoline production, to cost close to \$1,000,000.

Soviet Russian Government, Moscow, has authorized construction of 16 rayon mills in different parts of country to cost about 290,000,000 rubles (about \$155,000,000), and work on three of these plants will begin at once under direction of Oscar Kohorn & Co., Berlin, Germany, chemists and textile engineers. One mill will be located at Moscow and another at Leningrad. Eleven mills are scheduled to be ready for production within 36 months, each to include a power house, machine shop and other mechanical units. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency for Soviet Union.

Massey-Harris Co., Ltd., Toronto, Ont., manufacturer of agricultural implements and equipment, will merge subsidiary interest in Australia with H. V. McKay Proprietary, Ltd., Melbourne, Australia, manufacturer of similar tools and equipment. Both companies will retain corporate identity and propose to carry out a joint expansion and development program.

Polsko-Belgijskie Zakłady Chemiczne, S. A. (Polish-Belgian Chemical Co.), operated by Union Chimique Belge, Brussels, Belgium, has acquired 150 acres at Torun, Poland, as site for new plant for production of sulphuric acid, superphosphates and other chemical specialties, to cost over \$200,000 with machinery.

Ministry of Industry and Ministry of Finance, Provincial Government of China, Chekiang, have been authorized to arrange funds for early construction of group of Government-owned industrial plants, including several metal-working, chemical and textile mills, to promote manufacture and consumption of native products.

Two New York Jobbers of Steel to Merge

Egleston Brothers & Co., Long Island City, N. Y., have purchased the steel jobbing business of Froment & Co., 150 Bank Street, New York, and the merger of the two companies will become effective Oct. 1. Operations of the combined company will be centered at the Long Island City warehouse of Egleston Brothers & Co. Eugene McK. Froment, head of the Froment company, will become the vice-president of the Egleston company, which, with name unchanged, will continue under the executive direction of Albert J. Bragg.

The consolidation involves two companies which have been engaged in steel jobbing in the New York district for many years. The Froment company was organized in 1892 by Frank L. Froment, father of Eugene McK. Froment, while Egleston Brothers Co. is one of the oldest iron and steel jobbing concerns in the United States, having been in business 101 years.

Features of Convention of Electrochemists

Electrochemists and engineers from all parts of the world are contemplating attending the semi-annual convention to be held at the Hotel Statler, Detroit, Sept. 25 to 27.

Dr. F. N. Speller, well known authority on corrosion, and engineer of the National Tube Co., Pittsburgh, is in charge of the discussion to be held Thursday morning, Sept. 25, on "The Causes and Prevention of Corrosion of Automobile Parts." Results of an elaborate investigation will be presented by C. L. Hippensteel and C. W. Borgmann, of the Bell Telephone Laboratories, on the protection of iron and steel against corrosion by the application of zinc and cadmium coatings. The corrosion of aluminum parts will be discussed by O. W. Storey of the Burgess Laboratories, Madison, Wis. Stainless steel is the subject of a contribution by Prof. E. Newbery of the University of Cape Town, South Africa. Prof. O. P. Watts of the University of Wisconsin will show photographs taken at high magnification to illustrate what a good chromium plate on radiator shells should look like. How to improve the resistance to corrosion of chromium-plated automobile parts by heat treatment will be discussed by R. J. Wirshing of the General Motors Corporation. New methods of determining how resistant certain metals or metal deposits are to corrosion have been worked out by Karl Pitschner of the Firestone Steel Products Co. Within recent years the use of calcium chloride for allaying dust on automobile roads has become pretty common, and how this calcium chloride has brought about more intensive corrosion in some cases will be shown by H. S. Mougey of the General Motors Corporation.

The second scientific session will be held on Friday, Sept. 26, and the third on Saturday, Sept. 27. A new photovoltaic cell, applicable to talking moving pictures, will be demonstrated by Prof. Dwight K. Alpern of Swarthmore College. Other contributions will be concerned largely with the electro-deposition of various metals and alloys, and the electrochemical behavior of batteries and cells.

Dr. Richard Moldenke will preside at a round table discussion to be held Friday, Sept. 26. Radical improvements in the strength and general quality of cast iron have been made during the last decade. Engineers and metallurgists from this country and abroad will record their experiences in producing this high-test iron. Melting temperatures decidedly above those formerly employed appear to be an essential step in the manufacture of the new product. Advocates of the electric furnace will point out the advantages over fuel-fired furnaces for the melting of the iron.

Electrochemists will visit the plants of the Ford Motor Co., Parke Davis & Co., Champion Porcelain Co., Hoskins Mfg. Co., Ternstedt Mfg. Co., and the General Motors Research Laboratories. By special invitation from Henry Ford, the electrochemists will have an opportunity to inspect the Ford village with its unique collection of old machinery and equipment of historical interest. Leaving the village, the members will adjourn to the airport to witness special stunt flying.

Eastern Blast Furnaces Seek Rate Reduction

WASHINGTON, Sept. 9.—Blast furnace interests in Pennsylvania, New York and Massachusetts have filed a complaint with the Interstate Commerce Commission charging that rates from their furnaces to middle Atlantic and New England points are unreasonable as compared with rates from furnaces in Alabama and Tennessee. Indicative of present and former rates from Birmingham, the complaint cites the following, stated in dollars per gross ton:

To	Present Rates	Former Rates
Baltimore	\$5.00	\$5.76
Philadelphia	5.25	6.01
Providence, R. I.	5.75	6.91
New York	5.50	6.37
Boston	5.75	6.91

The complainants are Alan Wood Steel Co., E. & G. Brooke Iron Co., Colonial Iron Co., Delaware River Steel Co., Reading Iron Co. and Witherbee, Sherman & Co., having 10 furnaces with an annual capacity of 1,447,000 tons of pig iron. The complainants said that over the seven-year period ended Dec. 31, 1929, their actual production was approximately 52 per cent of capacity.

Allis-Chalmers Co., Milwaukee, reported unfilled orders Sept. 1 at \$16,217,000, compared with \$16,699,000 as of Aug. 1 and \$17,833,000 on July 1.

To Build Complete City for Pacific Exposition

The Beaver Centennial World's Exposition, Inc., which will hold an exposition in the Pacific Northwest in 1936, will build a complete permanent city to house the exposition at a cost of \$25,000,000 to \$30,000,000. This city will have 40 miles of streets and will include a complete sewerage system, double pressure water system, harbor improvements, athletic stadium, central heating and lighting systems, and a complete railroad yard to serve the industrial center to be developed later. The exposition company has opened offices at 815 Broadway Building, Portland, Ore., and the general manager is B. R. Perkins.

Foundry Sand Shippers Seek Lower Rates

Producers of foundry sand have retained Charles E. Vose, 80 Federal Street, Boston, Mass., to represent them before the Interstate Commerce Commission in hearings which commenced Sept. 9 on freight rates to points in Atlantic Seaboard States. It is contended that high freight rates are tending to restrict shipments of sand from New Jersey districts and Albany, N. Y. The sand shippers who are attempting to secure a downward revision of rates are the New Jersey Silica Sand Co., Millville, N. J.; George F. Pettinos, Philadelphia; Paxson-Taggart, Inc., Philadelphia; Whitehead Brothers, New York; Albany Sand & Supply Co., Albany, N. Y.

Norfolk, Va., Asks Lower Freight Rate on Steel

WASHINGTON, Sept. 9.—The Norfolk Port Traffic Commission has filed a complaint with the Interstate Commerce Commission asking that Norfolk, Va., be given the same rates on iron and steel products as those applying to Newport News, Va., under the general iron and steel rate decision, which went into effect May 20. The complaint cites the fact that rates from Pittsburgh, Youngstown and Chicago to Norfolk are 1c. per 100 lb. higher than those applying from these points to Newport News. Rates from these points to Norfolk are 36c., 38c. and 48c., respectively.

While the production of motorcycles in 1929 decreased to 31,912, valued at \$7,542,862 from 35,197, valued at \$8,000,683 in 1927, the output of bicycles rose to 307,845, valued at \$6,183,773, from 255,456, valued at \$5,803,440, according to the Bureau of the Census.

Illinois Steel Co. has recently placed in operation at Joliet, Ill., a \$300,000 sintering plant which has a rated capacity of 400 tons daily.

Low-Priced Continental Steel Invades Britain as Cartel Control Ends

(By Cablegram)

LONDON, Sept. 8.

INDICATIONS suggest that industrial recovery here will be very slow, but the outlook is slightly more hopeful and the Stock Exchange revival may prove to be a forerunner of improvement in business confidence.

The Continental Steel Cartel meets in Liege, Belgium, Sept 12, to discuss the problems arising from recent developments and to formulate measures for maintenance of the cartel. The future of the cartel may depend upon the outcome of these negotiations.

Certain branches of the Continental steel market are rather steadier, but conditions are variable and works are badly in need of business, except in France, where plants are still active, although even there delivery delays are shorter. Semi-finished steel prices have been marked down greatly following abandonment of control.

Continental Steel Invades Britain

While the British finished steel market is somewhat improved with expanding inquiry, buyers are slow to act, expecting possible reductions in prices as a result of weakness on the Continent.

The Briton Ferry Steel Works is closing for an indefinite period, following collapse of the semi-finished syndicate on the Continent and the ensuing break in prices. Continental semi-finished and finished steel is competing fiercely here and with prices far below domestic quotations buying interest has been aroused.

Low Quotations of Continental Mills to British Consumers Cause One British Steel Mill to Suspend.

* * *

Wages in Ruhr Coal Mines to Be Unchanged for Rest of This Year.

* * *

German Mills Seek Annual Quota of Light Gage Black Sheet Tonnage from Japan.

* * *

Japan Sells Copper to German Consumers at Less Than American Export Price.

The Indian Government will again aid the Tata Iron & Steel Co. by offering to pay 120 rupees instead of 110 rupees per ton for rails. The Tata company earnings have been seriously reduced by curtailment in the Indian Government Railways program.

Ruhr Coal Wages Unchanged

Moderate improvement is reported in German domestic demand. Arbitrators in the Ruhr coal wage dispute have declared for unchanged rates until the end of this year.

A proposal has been made in Belgium that the Government should increase its export guarantee, which is now 55 per cent of the export value

of goods shipped, in order to stimulate foreign trade.

French pig iron producers and consumers have concluded an agreement intended to eliminate foreign competition in the home market, particularly the Saar.

British Tin Plate Weaker

Tin plate prices are confused, with the minimum price 18s. (\$4.37) per base box apparently still in force, but makers outside the conference are accepting less and reports indicate that certain conference members have shaded the minimum. Domestic trade is quiet, but export demand is rather better. American mills recently booked 55,000 base boxes of tin plate for South America. Merchants are bearing the market expecting lower prices following the decline in sheet bars.

Galvanized sheet operations are substantially under capacity and Belgian mills are underquoting seriously. Black sheet business is still quiet and works are in need of orders.

Cleveland pig iron is quiet and although Continental competition is keen, larger domestic buying is expected by fall. The hematite market is better with home consumers accepting heavier deliveries, and some sales have been made for export. As a result, surplus stocks are likely to be reduced.

French output in July was 860,000 metric tons of pig iron and 789,000 tons of raw steel. Furnaces in blast at the beginning of August totaled 127.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Ferromanganese, export.	£11 10s.	\$55.95
Billets, open-hearth.....	5 17½ to £6 5s.	28.46 to \$30.41
Black sheets, Japanese specifications.....	12 5 to 0 17½	59.61 to 4.32
Tin plate, per base box..	0 17½ to 0 18	4.32 to 4.38
Steel bars, open-hearth..	7 15 to 8 5	1.69 to 1.79
Beams, open-hearth.....	7 7½ to 7 17½	1.60 to 1.71
Channels, open-hearth...	7 12½ to 8 12½	1.66 to 1.87
Angles, open-hearth.....	7 7½ to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	9 10 to 9 15	2.06 to 2.12
Galvanized sheets, No. 24 gage.....	11 17½	2.57

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.....	£2 13s.	\$12.90
Billets, Thomas (nominal)	3 16 to £3 18s.	18.47 to \$18.95

Wire rods, low C., No. 5 B.W.G.	£6 2s.	to £6 4s.	\$29.69 to \$30.19
Rails, light	6 0		29.20
Black sheets, No. 31 gage, Japanese.....	11 5	to 12 12	54.68 to 58.32
Steel bars, merchant....	4 6		Cents a Lb. 0.95
Steel bars, deformed....	4 10	to 4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal) ..	4 5	to 4 6	0.94 to 0.95
Channels, Thomas, American sections	5 12	to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick	4 8½	to 4 9½	0.97 to 0.98
Angles, Thomas, 3-in. ...	4 5	to 4 6	0.94 to 0.95
Hoop and strip steel over 6-in. base	5 0	to 5 2½	1.10 to 1.12
Wire, plain, No. 8 gage...	6 0	to 6 12½	1.32 to 1.46
Wire, barbed, 4-pt. No. 12 B.W.G.	10 0	to 11 0	2.21 to 2.43
Wire nails, base.....	6 2½	to 6 12½	\$1.35 to \$1.46 a keg

New Markets Found by German Hardware Trade

HAMBURG, GERMANY, Aug. 27.—German exporters of hardware are profiting from the general depression in world markets. Formerly, purchases of hardware by foreign buyers were usually placed in the country to which raw products, such as coffee, rubber or cotton were sold. Recently prices for such raw products have been so low that buyers in the foreign markets have little or no profit and have been chiefly interested in satisfying their requirements at the lowest possible price. As a result German exporters have been selling wire netting to the Indian tea planters and to the wool industry of Australia and exports of wire rope to the Philippines have increased. While exports of certain hardware products have declined slightly this year, the industry has been able to develop certain overseas markets which formerly provided but little business.

German Machinery Output Declining

HAMBURG, Aug. 26.—While the export machinery business continues satisfactory, domestic trade is quiet, especially in machine tools. As a whole, the German machinery industry operated at 57 per cent in the early part of this month. Operations in the same period of July were at 59 per cent of capacity and in August, 1929, at 74 per cent.

Germany Buys Japanese Copper at Low Prices

HAMBURG, GERMANY, Aug. 27.—Recently German consumers have been buying electrolytic copper from Japanese producers. A shipment of about 100 tons has already arrived at this port. Buyers claim the Japanese price is 7s. 6d. per metric ton (4/5c. per lb.) less than the quotation of the American sellers.

Continental Skyscraper Is 28 Stories High

DUISBURG, GERMANY, Aug. 26.—An office building that may be classified as a skyscraper for the European Continent is being completed for a banking house in Antwerp, Belgium, by the Demag, A. G. It is a 28-story building and required 3000 tons of structural steel.

German Sheet Mills Seek Quota from Japan

DUSSELDORF, GERMANY, Aug. 26.—German mills rolling light gage black sheets of Nos. 30 and 31 gage, such as are required by Japanese consumers, have booked almost no business from Japan recently and are under-

stood to be negotiating with the chief Japanese mills for an agreement fixing a quota. It is suggested that German mills could be granted an annual quota, possibly not to exceed 17,500 tons, and the allotment could be sold through Japanese companies. Present demand for light gage sheets is so small that German producers would apparently be willing to consider business at about £11 (\$53.46) per ton, f.o.b. German port or Antwerp.

German Motor Car Maker Increases Output

HAMBURG, GERMANY, Aug. 27.—With most of the German motor car builders restricting production of automobiles, the Opelwerke, subsidiary of the General Motors Co., has announced an increase in its production program of 40 per cent in commercial vehicles and 20 per cent in other cars.

Heavier Rods Used by German Wire Mills

HAMBURG, GERMANY, Aug. 27.—German wire mills are beginning to follow the American practice of drawing wire from heavier gage rods. Most German mills have largely used Nos. 2 to 4 gage rods, while American mills draw a considerable tonnage of Nos. 5 and 6 gage. German mills have found that by using the heavier wire rods, better and stronger nail wire is drawn.

Coal Stocks Good for 31 Days

Bituminous coal in the hands of industrial consumers in the United States is in sufficient quantity to last for 31 days at current rates of consumption, according to an analysis made by the National Association of Purchasing Agents. By-product coke plants have enough for 28 days, electric utilities for 61 days, railroads for 19 days, steel mills for 40 days and other industries for 34 days.

Stocks in industrial hands, including both bituminous and anthracite, were estimated at 32,735,000 net tons

on Aug. 1. This shows an increase of about 4 per cent during July and is the largest total since that of March 1. It is almost precisely the same figure as was reported one year earlier.

Industrial consumption during July is given as 30,496,000 tons, which is the smallest in considerably more than a year. The reduction from June was about 3.7 per cent. Comparing with July, 1929, there was a reduction of about 13 per cent. Production of coal in July is stated as 40,373,000 tons, which is 4 per cent larger than in June, but otherwise the smallest (save in March) in considerably more than a year.

Smaller Production of Steel Barrels

WASHINGTON, Sept. 4.—Production of steel barrels in July totaled 617,420 units, or 44 per cent of capacity of the 32 plants which reported to the Department of Commerce. The output in June was 651,559 barrels, or 46.4 per cent of capacity. The July total was the smallest since last November, and compares with 790,175 a year ago. Shipments were 621,145 barrels in July and 638,358 barrels in June.

In the first seven months production totaled 4,910,786 barrels, or 50.9 per cent of capacity, against 5,041,119 barrels, or 60.7 per cent of capacity, last year. Stocks at the end of July were 72,507 barrels, against 76,232 at the end of June.

Unfilled orders at the end of July for delivery within 30 days were for 311,630 barrels, compared with 319,754 at the end of June. Unfilled orders for delivery beyond 30 days were 984,224 barrels, compared with 968,858 at the end of June.

In the 14 months ended July 31, 1930, the Milwaukee plant of the Westinghouse Lamp Co. completed 758,132 hours of work without a lost-time accident. At the present writing the record is still unbroken. Since the last lost-time accident on June 6, 1929, the 300 employees of the factory have turned out 36,612,223 incandescent lamps.

United States Imports of Pig Iron by Countries of Shipment

(In Gross Tons)

	July		Seven Months Ended July	
	1930	1929	1930	1929
British India.....	800	412	7,148	27,284
Germany.....	8,238	5,120	52,751	30,559
Netherlands.....	350	818	50	103
Canada.....	.....	54	5,552	18,292
France.....	.....	.....	392	525
Belgium.....	.....	.....	.....	101
Norway.....	668	.....	.....	184
Sweden.....	200	306	2,731	1,340
All others.....	.....	33	2,019	1,309
Total.....	9,756	6,743	666	507
			71,309	80,204

From United States Department of Commerce.

Heat Treatment of Alloy Steel Castings

(Continued from page 695)

the more expensive steels, such as nickel-chrome. In the fully-quenched and drawn condition, it gives excellent results for many purposes.

Nickel-chrome steel ranks second in favor, according to a recent survey. It can be said of this steel that it has been used in castings for upward of 20 years, and has an established record of dependability. It is being challenged by many other newer steels, such as chrome-molybdenum, and a variety of compositions featuring manganese in association with other elements such as nickel, chromium, and molybdenum.

Published data indicate that almost all these steels, when properly made, yield maximum values of the same general order as nickel-chrome steel, and, of course, they are somewhat cheaper. Physical characteristics are not, however, a full indication of worth. Constant performance and general reliability are the main requisites. Ease of furnace control, simplicity in foundry manipulation, good but not supersensitive response to heat treatment, and ready machinability, are all factors which go to make a good alloy steel. Until enough information is available to rate the newer steels on these latter characteristics, one must, in their use, abide by the experience of the manufacturer.

Air-Hardening Type for Intricate Castings

A third distinct class of alloy castings is the so-called "air-hardening" type. These are usually a chrome-nickel-molybdenum analysis, but may also be made by omitting nickel and increasing the molybdenum content. Such steel is recommended for intricate castings, where high strength is desired without resort to oil or water quenching. It is primarily a type adapted for normalizing treatments, but if one desires the maximum obtainable strength, and the casting will stand oil or water quenching, tensile strengths in the neighborhood of 200,000 lb. per sq. in. may be had with these steels, accompanied by yield points in excess of 150,000 lb. per sq. in. Unfortunately, the quenching of this type of steel is not always advisable, due to danger of cracking, but even in the normalized condition the tensile properties are still practically equal to those of other steels which have had full-quenching treatments.

One does not find in steel castings the many carbon gradings which are found in forging steels. The general tendency is to hold to an approximate range of 0.25 to 0.35 per cent carbon, and there is a small trend at present toward the use of still lower percentages. It should be borne in mind that even the simplest type of carbon steel casting is in essence an alloy steel. Practically all steel castings carry upward of 0.20 per cent silicon, added for deoxidation, and would, therefore, comply readily, for instance, with A. S. T. M. specification A94-27, which is designated as a silicon structural steel, and classified as an alloy type.

All of the cast alloy types, therefore, are somewhat more complicated than the corresponding

forging grade, and excess of carbon is not to be recommended. In the attempt to supply maximum ductility, some 2.50 per cent nickel cast steels have been produced, with carbon at approximately 0.15 per cent, which yield 65 per cent reduction of area, and it is claimed that 38 per cent elongation and 75 per cent reduction of area have been obtained from a nickel-chrome-molybdenum-vanadium combination having a similar low-carbon content. Experience up to the present time, therefore, indicates the advisability of holding the carbon at a moderate figure, and depending on the alloys for higher strength.

Heat Treatment Like That for Forgings

Aside from such preliminary treatments as may be required to break up the cast structure, there is no reason for considering the heat treatment of castings as differing in any way from general practice for forging steels.

Temperature and time of heating for preliminary treatments vary with the size of castings and their internal structure. Temperatures may range from 1650 deg. for small and medium castings, up to advocated temperatures of over 2000 deg. for pieces of extremely heavy section. The time may vary from a few hours for small castings to a matter of days for the largest sizes.

Out of the literature and information available on high temperature annealing, by which is meant temperatures of from 1800 deg. upward, one may summarize the experience of various investigators by stating that such treatments are sometimes beneficial, and never harmful, when followed by proper finishing treatments. Their particular application is for heavy castings. In those cases of extremely large castings where high temperature treatments have been found to be advantageous, these treatments are usually followed by a second treatment at a lower temperature to effect maximum grain refinement. With such castings, the size precludes quenching, and normalizing or full-annealing are the usual practice.

It might be stated that a deficiency in strength or ductility in the center of a heavy section does not necessarily imply faulty treatment. The first place to look for correction of such trouble lies in molding and pouring practice. Two foundries were recently confronted with the repeated failure of a part involving a metal section 6 in. x 15 in., which was highly stressed in service. Usual procedure would be to place a heavy riser over the critical section. In this case, the riser was removed from the critical zone in order to induce selective freezing, while at the same time maintaining the density by increased ferrostatic pressure. The remedy proved satisfactory.

Commercial custom in the treatment of small and medium-sized castings is to give one normalizing, or occasionally annealing, at a temperature of approximately 1650 deg. Fahr. For alloy castings, this is usually followed by a draw heat to impart the neces-

sary toughness. For many types of service, this treatment will be satisfactory, but the full latent qualities of alloy castings are only brought out by full-quenching in oil or water. As compared with standard normalizing practice, full quenching will usually effect an improvement of fifty per cent or more in physical properties.

Confusion As to What Heat Treatment Means

In view of this fact, it is unfortunate that purchasers of steel castings are sometimes confused in the belief that the term "heat-treatment" implies full-quenching, when, as a matter of fact, it may indicate only annealing or normalizing. Until recently, the term heat-treatment was usually understood in the more restricted sense, but by common agreement of leading engineering societies, it is now used to indicate any process of heating and cooling of metals or alloys in the solid state, intended for

the purpose of bringing about a change in properties. If full-quenching treatments are desired, therefore, the fact should be indicated in order to avoid misunderstanding. Most foundries, as a rule, are prepared to furnish any treatment the customer may desire, either through their own organization, or through connections with commercial heat-treating establishments where complete facilities are available.

An attempt has been made in this article to indicate the progress which steel foundries have made in the manufacture of alloy castings, and the active interest which is being taken in this subject at the present time. The use of heat-treated alloy castings is still in its early stages, but sufficient has been said to indicate the large possibilities which lie in this field. The attitude of progressive steel foundries is one of preparedness to serve the prospective user.

Heat Treatment for Gray Iron Castings

(Continued from page 690)

to obtain a material increase in machinability. It has been found that increased production and longer tool life will more than compensate for cost of heat treatment. However, it must be pointed out that we can go too far in the direction of easier machinability. There are castings where the maximum in strength is required and no sacrifice to machinability should be made in such cases.

The temperature employed ranges from 1200 to 1600 deg. Fahr. Beginning with about 1200 deg. Fahr. for ordinary cast iron, there is a rapid drop in physical properties, including hardness, transverse strength, and tensile strength. At the same time, there is an increase in the machinability of the material. In a good many instances, higher temperatures are being employed than are necessary to secure the desired results insofar as machinability is concerned.

The details of heat treatment will depend upon the character of the castings and upon the composition of the metal. Cast irons containing chromium are less susceptible to annealing than are the ordinary cast irons.

Two Annealed Irons Compared

A cast iron without alloys and one containing nickel and chromium were subjected to a series of annealing treatments. These two irons have the chemical analysis and physical properties in the "as cast" condition, as given in Table I. It will be noted that these two irons are quite similar, with the exception that the alloy cast iron has a nickel content of 0.62 per cent and a chromium content of 0.25 per cent. Both irons were made in the same cupola under identical conditions with the exception that ladle additions of nickel shot and ferrochromium were made to one of the irons.

Your attention is invited to the photomicrographs showing the two irons in the "as cast" condition and also after annealing at 1000 deg. and at 1600 deg.

Fahr. These are shown in Figs. 1 to 6 inclusive. The structures of the two irons are very similar in the "as cast" condition. After the heat treatment at 1000 deg. Fahr. there is very little change. After the anneal at 1600 deg. Fahr., there is a very marked change in the regular cast iron, the pearlite having been changed over into ferrite and graphite. In the alloy cast iron, there has been very little change. Confirming the microscopic examination, it was found that the regular iron had suffered a large loss in Brinell hardness, while the drop on the alloy iron was quite small. A small percentage of chromium has a marked effect upon the annealing characteristics of a cast iron.

A desirable method for the heat treatment of cast iron is to heat the casting slowly up to temperature, hold for a definite period and then cool slowly. A thoroughfare type of furnace offers a very excellent means of doing this work and consequently this type of furnace is largely used on production work.

Two Types of Furnaces Used for Heat Treating

An electric counterflow annealing furnace, which is installed in an automobile plant, is shown in our illustration while an oil-fired thoroughfare type annealing furnace, installed in a tractor plant, is reproduced in another illustration. Both are in the Middle West. The method of handling the castings through the furnace is the same in both cases. The castings are loaded on alloy trays, which are put through the furnace. The electric furnace is the counterflow type while the oil-fired furnace has both rows of trays moving in the same direction. The electric furnace has a capacity of 1500 lb. per hr. as against 1800 lb. per hr., for the oil-fired furnace. Both furnaces have two zones of temperature control.

Gray iron castings may be quenched, or quenched and drawn, in order to increase hardness or strength.

This type of heat treatment is employed only in a limited way commercially. It appears to offer a good field for study, particularly where wearing qualities are important. It should be pointed out that there is a possibility of serious distortion in the quenching of castings, particularly those of intricate shape.

Test bars from the regular iron and the alloy iron referred to above were subjected to a heat treat-

ment consisting of a quench from 1450 deg. Fahr. and other bars were subjected to a heat treatment consisting of a quench from 1450 deg. Fahr. followed by a draw at 800 deg. Fahr. The results of test are given in Table II. It will be noted that quenching has resulted in a considerable increase in hardness and some increase in strength and the alloy cast iron appears to gain more from this treatment.

Heat Treatment in Aircraft Engine Parts

(Continued from page 679)

This point is often overlooked but it has a very real significance in the strengthening of such engine parts as crankcases which are subject to considerable stress and vibration.

Aluminum alloys are readily affected by overheating slightly above the solution temperatures. In some cases as little as 30 deg. above the solution temperature will cause deterioration in the material. Overheating can be detected most readily by loss in tensile strength, elongation and microscopic examination. It can not generally be detected by hardness tests unless the overheating has been very drastic.

Heat Treatment Has Lightened Certain Steel Parts

The improvement in physical properties of steels as obtained by heat treatment is common knowledge and does not require any special treatment here. However, without the advantages of these improved physical properties, aircraft engine parts would not be capable of withstanding the stresses imposed upon them during their service life. Heat treatment has helped to a considerable extent in lightening the construction of steel engine parts.

Several examples of the light construction employed in aircraft engines are shown in another illustration. The master rod of a radial air-cooled engine, shown at the left, has been whittled out until it is practically a skeleton, nevertheless, this part functions satisfactorily as one of the highly stressed members of the engine. Gears are reduced in many cases to the form of large hollow shells or thin spidery constructions as shown in the same picture. However, such parts will function satisfactorily when properly heat treated. These types of construction are necessary to the production of light compact engines.

These light gear constructions require particular attention in the heat-treating room to prevent deformation or rupture when hardening. To overcome this difficulty it is necessary to employ quenching dies especially adapted to each part. These dies, when properly designed, produce uniformly hardened parts, accurate to form and dimensions. These dies are used with a quenching machine like the standard Gleason type which greatly facilitates control of the quenching operation.

The extreme hardness obtainable by heat treating is indispensable in resisting wear on such parts as push rod ball ends, cams, cam rollers, valve tips, valve guides and other parts which may be subject to constant abrasion under high intensity of pressure. This is particularly important when such parts are so lo-

cated that they are difficult to reach with adequate lubrication, which is sometimes the case in radial aircraft engines. Parts in lower cylinders which are readily lubricated may not require extreme hardness.

It is also true that much of the difficulty in overcoming excessive wear is due to the fact that the parts are operating at elevated temperatures. This not only causes softening of the steel but prevents satisfactory lubrication. The selection of proper material and heat treatment has helped in overcoming such difficulties.

Heat Treatments to Improve Machinability

In addition to the heat treatments required to produce the strength to withstand service conditions, much attention has been given to heat treatments that produce improved machinability. This is especially important in the finishing of gear teeth which, when properly heat treated, can be produced with a very smooth tooth face. These smooth surfaces mean less wear in service and are particularly advantageous in preventing pitting.

While great advantages are obtained by heat treatment, due to improved properties of materials, it is also possible to cause considerable damage by improper heat treatments. Unless the heat treatment is properly performed it would be better that it were not done at all as the part may be more prone to failure than if not treated. The effect of slightly overheating aluminum alloys has already been described. With steels the dangers of overheating, burning or decarburizing, quenching cracks, etc., are well known. In aircraft engine construction the occurrence of these deficiencies of heat treatment are almost sure to lead to failures in service so that every precaution should be taken to prevent their occurrence.

Parts should be heat treated in accordance with a definite specification that has been developed as the most satisfactory for the material used and the design of the part. For instance, in some cases crankshafts must be quenched on a time basis. They must be removed from the quenching tank before they are completely cooled in order to prevent cracking. A similar precaution is often necessary with aircraft valves.

Heat treatment of aircraft engine parts should only be carried out under accurately controlled conditions. The furnaces should be equipped with automatic controls, autographic recording devices, etc. In a large heat-treating room, where a number of furnaces are operated, the recording instruments should be located in a central instrument room under the observation of a responsible operator.

National Metal Congress Exhibitors

(Continued from page 708)

ship, capable of handling injurious gases and acid fumes. In attendance: A. W. Peard, Western manager; F. A. Wright, special representative, and R. A. Brackett, sales department.

Standard Alloy Co., Inc., Cleveland. Booth 30-D.

Standard Alloy beams, rails and miscellaneous parts for normalizing and pack heating and pair heating furnaces; roller hearth disks and spacers; insulated shaft assembly for normalizers; enameling burning racks; chain grate castings for heat resisting service; furnace trays and shoes; roller rails; skid rails and shoes; pump casings and impellers; furnace parts and miscellaneous heat and acid resisting castings covering in general the heat treating and chemical field; also return bends, elbows and fittings for use in the oil industry. In attendance: Harvey M. Smith, sales manager; Frank E. Jackson, superintendent; Emerson M. Williams, secretary; W. D. Mann, manager, Providence office; George S. McFarland, Columbus office; A. D. Darragh, New York representative; William M. Titzel, Chicago representative, and Wharton L. Peters, St. Louis representative.

Steel City Testing Laboratory, Detroit. Booth 41-B.

Power operated Brinell testing machine, type #3, for production testing, with foot pedal operation giving operator use of both hands for handling specimens and direct reading attachment; type R-3 sheet metal tester, testing sheets up to $\frac{1}{8}$ in. in thickness and also $\frac{1}{4}$ in. in thickness; this type of apparatus can be supplied with tensile testing attachment and autograph recorder; type P hardness testing hammer, portable apparatus for testing large specimens, smaller type for testing small specimens; Electro Magnetic Crack Detector for detecting cracks in steel and iron parts for autos, buses, railroad rolling stock, machinery, etc.; transverse type tester for testing transverse strength of castings and bending qualities of various materials; this machine is hydraulic, style A standard hand-operated Brinell testing machine.

Stoody Co., Whittier, Cal. Booth 103.

Photographic and sample display of welded-on overlays made from alloy welding rods. In attendance: Miles C. Smith, manager sales promotion; J. C. Blake, general sales manager; C. E. Phillips, president, C. E. Phillips & Co., Detroit and Chicago, and C. P. Kopton, Chicago representative, C. E. Phillips & Co.

Strong, Carlisle & Hammond Co., Cleveland. Booth 34.

Type 55 S. C. & H. heavy-duty high speed steel hardening furnace arranged for 550 B.T.U. gas with McKee mixer for single valve hand control; No. 1002 Spencer turbo compressor with 3 phase, 60 cycle, 220 volt motor and hand starter and No. 1 discharge; a number of furnace photographs; a small miscellaneous exhibit of furnace parts. In attendance: R. P. Bethke, A. B. Lindsay, Jacob Weintz, F. C. Parsons, sales engineers; Charles Klauke, sales representative; Fred Leopold, furnace operator; G. S. Peterson, manager, furnace department.

D. A. Stuart & Co., Ltd., Chicago. Booth 4-D.

A complete line of metal-working oil products and lubricating specialties; in addition, there will be a novel and simple mechanical puzzle which will test the brain power of visitors at their booth. In attendance: C. I. Grieron, president; T. B. Langdon, director of sales; W. H. Oldacre, director of research and engineering; W. H. Huelster, western sales manager; C. H. Baker, Ohio manager; B. W. Deaton, Michigan manager; G. A. Dudley, New York manager; A. S. Hull, Philadelphia manager; A. J. McDuff, New England manager.

Surface Combustion Co., Inc., Toledo. Gas Section.

T

Taylor-Winfield Corporation, Warren, Ohio. Booth 94.

Both butt welding and spot welding machines, incorporating some new features. In attendance: J. A. Anderson, president, Denton & Anderson Co.; W. A. Anderson, vice-president, in charge of sales of the Denton & Anderson Co.; George E. King, manager of Chicago district office, Denton & Anderson Co.; C. T. Marsh, service engineer; C. A. Gould and C. G. Bassler.

Thomson-Gibb Electric Welding Co., Lynn, Mass., and Bay City, Mich. Booth 97.

New style heavy-duty air operated double roll type of seam welder; latest design of welding press; improved medium duty butt welder; two small standard spot welders; display of representative samples of welded products. In attendance: W. H. Gibb, vice-president; C. E. Shearer, assistant to vice-president; C. O. Watson, manager, Chicago district

office; R. B. Stout, Chicago district office; R. L. Brown, manager, Albany district office; A. E. Hackett, manager, Detroit district office; D. A. Clements, St. Louis district office; P. B. Hall, Indianapolis representative; C. K. Stone, Minneapolis representative, and G. K. McMullen, Grand Rapids representative.

Timken Steel & Tube Co., Canton, Ohio. Booth 1-D.

A display of various sizes of bars and other shapes as well as an assortment of seamless tubing. In attendance: M. T. Lothrop, president; J. W. Spray, vice-president; A. J. Stanford, vice-president in charge of sales; E. F. Talmadge, Chicago office; Robert Atkinson, Detroit office; S. D. Williams, Canton office, and W. G. Hildorf, metallurgist.

Harold E. Trent Co., Philadelphia. Booth 36.

U

Una Welding & Bonding Co., Cleveland. Booth 105.

Una welders, both a.c.-d.c. and d.c. types; these welders are available both as single or double operator machines; the new Una semi-automatic welding unit; also the Una full-automatic arc welding head; complete line of Una welding rods for manual and automatic welding. In attendance: E. W. Kronbach, A. A. Probeck, L. R. Berkeley, L. S. Burgett and J. B. Austin.

V

Vanadium-Alloys Steel Co., Latrobe, Pa. Booth 24-B.

Fractures and samples of high-speed, carbon and alloy tool steels; Vascloy tungsten carbide tools. In attendance: R. C. McKenna, president; Floyd Rose, vice-president; L. D. Bowman, works manager; J. P. Gill, chief metallurgist; R. B. George, metallurgist; R. R. Artz, special representative; C. V. Reilly, Cleveland representative.

Vanadium Corporation of America, New York. Booth 9-F.

Ferro-vanadium, ferro-chromium, ferro-silicon, ferro-titanium, alsi-fer, specimens of vanadium steel applications, such as automobile parts, airplane engine parts, railroad and automobile springs, tools, etc. In attendance: B. D. Saklatwalla, vice-president; G. L. Norris, chief metallurgical engineer; H. T. Chandler, assistant to the president; Jerome Strauss, chief research engineer; J. A. Miller, general manager of sales; C. B. Woodworth, manager, Western division; Walter Smith, assistant manager, Western division; C. N. Dawe, manager, automobile division; T. Bourke, assistant manager, automobile division; A. W. Demmler, metallurgist.

Vulcan Crucible Steel Co., Aliquippa, Pa. Booth 10-B.

High-speed, alloy and carbon tool steels and special steels. In attendance: S. G. Stafford, president; R. M. Kelso, A. D. Beeken, Jr., S. B. Minton, E. H. Lurker, Chicago Branch manager; O. H. Beall, Chicago, and E. V. Hobson, Chicago.

W

Weaver Brothers Co., Adrian, Mich. Booth 29-B.

Complete pickling room display showing application of the methods to control temperature and acid concentration of the pickling solutions. In attendance: J. C. Weaver, vice-president; D. E. Stamm, chemist; H. E. Rose, secretary.

Wedge Lock Tool Co., Chicago. Booth 10-L.

See: Illinois Tool Works.

Wheeling Mold & Foundry Co., Wheeling, W. Va. Booth 61.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. Booth 8-D.

Replicas of warehouses, heat treating and forging plants, as well as an exhibit of special parts showing applications of various Hy-Ten alloy steel compositions. In attendance: A. O. Fulton, president; F. H. Lovejoy, vice-president; S. W. Parker, Chicago manager; A. R. Townsend, F. J. DeVan and H. A. Bischoff, Chicago sales organization.

Westinghouse Electric & Mfg. Co., East Pittsburgh. Booth 76.

Portable, 200 and 400 amp., Flex-Arc, single operator welding units; automatic seam welder equipped with Weldomatic head to demonstrate automatic welding of longitudinal seams; the 200 and 400 amp., single operator units used to demonstrate Flex-Arc welding electrodes; also views of electric furnace installations in the metal industry. In attendance: W. W. Reddie, section head, arc welding sales; W. C. Pearson, welding specialist; G. H. Koch, welding engineer; T. C. Kelley, section head, industrial heating; C. W. Babcock, Boston; H. C. Bostwick, New York; J. W. Allison, Philadelphia; J. F. Baker, Pittsburgh; T. J. James, Cleveland; W. C. Stevens, Detroit; J. Mixsell, J. H. Germany, M. S. Boreen, J. C. Woodson, C. H. Carpenter, R. H. Allen, W. Roth, O. A. Colby, F. Kerin.

Whitman & Barnes, Inc., Detroit. Booth 4.

Hercules Major drills for drilling high manganese steel, and

Hercules interchangeable punches and reamers; test blocks of 10-15 per cent manganese steel will be drilled under varied conditions and to different depths; various size drills will be used to show that manganese steel can be drilled on a production basis; also a punch press fitted with a die completely equipped with Hercules interchangeable punches and retainers, will run on a production piercing job to show the interchangeable merits and stripping strength of Hercules punches; also the regular line of Hercules high-speed twist drills and reamers, and the new Blue Diamond small high-speed drill. In attendance: E. D. Wolf, assistant sales manager; R. O. McGraw, assistant sales manager; F. T. Harrington, chief engineer; W. R. Breeler, metallurgist; M. J. Kearins, manager Chicago office; H. D. Streiluf, salesman.

Wickwire-Spencer Steel Co., New York. Booth 74.

A model of a furnace, showing operation of Wisscoloy spirally woven conveyor belt, such as is used in continuous heat treating furnaces up to 1800 deg. Fahr.; belts of similar construction, made of soft steel in special designs, used for conveyors from quench tanks and other purposes where the economical handling of material under severe conditions is required; Wissco oil-tempered, spiral, helical, torsion and flat springs will be shown and a torsion fatigue testing machine

will demonstrate the resistance to fatigue of Wissco valve spring wire. In attendance: M. G. Werme, O. C. Floss, V. C. King, E. F. Early, R. R. Tatnall, F. J. Connor, J. R. Worsfold, sales manager; F. W. Hale, department sales manager; C. R. Coffeen and M. A. Bloomquist.

Y

Young Brothers Co., Detroit. Booth Gas Section.

Experimental oven, direct gas heated, with automatic control and equipped with internal recirculating system; one truck type oven, equipped with a combination of direct, indirect and remote gas heat, featuring different types of controls and safety appliances. In attendance: R. B. Reed, sales manager; C. G. Lisch, assistant sales manager; V. A. Fox, chief engineer, and T. P. McVicker, Chicago manager.

Z

Ziv Steel & Wire Co., Chicago. Booth 17-B.

A display of tools, cutlery, dies and specimens of fabrications. In attendance: G. F. Ziv, president; F. A. Lawler, executive vice-president; N. J. Hyslip, vice-president; H. E. Ziv, treasurer; A. F. Brunck, general sales manager; J. D. Hall, C. A. Mulligan and C. A. Hintz, branch managers; P. S. Seck, E. J. LaCroix and R. J. Foley, salesmen.

Program for National Metal Congress

THE 1930 National Metal Congress, which will convene in Chicago the week of Sept. 22, will have 35 technical sessions on its program. The American Society for Steel Treating, the American Welding Society and the American Society of Mechanical Engineers are each devoting eight sessions to the presentation of technical papers. The American Institute of Mining and Metallurgical Engineers will have seven such sessions.

Meetings of the American Welding Society will be held in the Congress Hotel, but the National Metal Exposition and the technical sessions of the other societies in the congress will be held in the Hotel Stevens. More than 175 companies will exhibit their products at the exposition.

In addition to its technical programs, the steel treaters have arranged a session on sales problems and methods. Prof. R. C. Borden and Alvin C. Busse of New York University will present a dramatized lecture on sales strategy, and other talks of similar nature are scheduled.

Steel Treaters' Papers

The American Society for Steel Treating has arranged the following program:

Monday, Sept. 22

"Corrosion and Heat Resistant Nickel-Copper-Chromium Cast Iron," by J. S. Vanick and P. D. Merica, International Nickel Co., New York.

"Fatigue Tests of Small Specimens with Reference to Size Effect," by R. E. Peterson, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Physical Properties of Fine Bolts," by H. B. Pulsifer, Ferry Cap & Set Screw Co., Cleveland.

"Electrolytic Decomposition of Cementite and Austenite," by H. A. Schwartz, G. M. Guiler and H. H. Johnson, National Malleable & Steel Castings Co., Cleveland.

"Stresses and Cracks in Hardened and Ground Steel," by G. R. Brophy, General Electric Co., Schenectady.

"Cemented Tungsten Carbide," by Greg-

ory J. Comstock, Firth-Sterling Steel Co., McKeesport, Pa.

"Estimation of Internal Stress in Quenched Hollow Cylinders of Carbon Tool Steel," by O. V. Greene, Carpenter Steel Co., Reading, Pa.

"Cold Heading Die Life," by A. S. Jameson, International Harvester Co., Chicago.

"Effects of Prequenched Treatments on the Hardness, Body and Structure of Hardened Tool Steel," by R. H. Harrington, General Electric Co., Schenectady.

Tuesday, Sept. 23

"Forging Practice, United States Naval Gun Factory," by S. L. Blankenship, Naval Gun Factory, Washington.

"Heat Treatment Furnaces Used in Manufacture of Telephone Equipment," by W. A. Timm, Western Electric Co., Chicago.

"Scaling of Steel at Forging Temperatures," by W. E. Jominy and D. W. Murphy, University of Michigan, Ann Arbor.

"Copper Brazing in Hydrogen Electric Furnaces," by H. J. Webber, General Electric Co., Schenectady.

Wednesday, Sept. 24

Campbell Memorial Lecture

"Oxygen in Steel," by Dr. Marcus A. Grossmann, Republic Steel Corporation, Canton.

"Radiography by the Use of Gamma Rays," by R. F. Mehl, Naval Research Laboratory, Washington, G. E. Doan and C. S. Barrett.

"Critical Ranges in Pure Iron-Carbon Alloys," by R. H. Harrington, General Electric Co., and W. P. Wood, University of Michigan, Ann Arbor, Mich.

"Relationship Between Welded-on Overlays and Heat Treatment," by Miles C. Smith, Steady Co., Whittier, Cal.

"The Tungsten Carbon System," by W. P. Sykes, General Electric Co., Cleveland.

"Concentrated Pressure and Its Applications to the Rolling Process," by Dr. A. Nadal, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Thursday, Sept. 25

"Influence of Nickel on the Chromium-Iron-Carbon Constitutional Diagram," by V. N. Krivobok, Carnegie Institute of Technology, and M. A. Grossmann, Republic Steel Corporation, Canton.

"Study of a High-Chromium, Low-Carbon Steel," by Arthur Phillips, Yale University, and R. W. Baker, Republic Steel Corporation.

"Corrosion Test for Research and Inspection of Alloys," by W. R. Huey, E. I. du Pont de Nemours & Co., Wilmington, Del.

"Nature of the Nickel-Chromium Stainless Steels," by Edgar C. Bain and Robert H. Aborn, United States Steel Corporation, Kearny, N. J.

"Process Reliability in Steel Making," by George A. Dornin, Gathmann Engineering Co., Baltimore.

"Tensile Properties of Carbon Steel Castings," by R. L. Dowdell and J. V. McCrae, Bureau of Standards, Washington.

"Casting Guns by the Centrifugal Process," by Col. Tracy C. Dickson, Watertown Arsenal, Watertown, Mass.

"Steel Ingots," by H. H. Ashdown, Irvine, Pa.

Friday, Sept. 26

"Nitriding in Packing Materials and Ammonia," by A. B. Kinzel and J. J. Egan, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

"Further Investigations in Nitriding," by Robert Sergeson and H. J. Deal, Republic Steel Corporation, Massillon, Ohio.

"Nitriding the Larger Forgings," by J. H. Higgins, Camden Forge Co., Camden, N. J.

"Nitriding Furnaces and Their Equipment," by W. J. Merten, Westinghouse Electric & Mfg. Co., East Pittsburgh.

"Microcharacter Hardness Tester," by C. H. Bierbaum, Lumen Bearing Co., Buffalo.

"Relation of Structure to Surface Hardness of a Case Hardened Steel," by H. W. McQuaid and O. W. McMullan, Timken-Detroit Axle Co., Detroit.

"Recent Developments in Gas Carburization," by O. J. Wilbor and J. A. Comstock, Peoples Gas Light & Coke Co., Chicago.

"Modifying Action of Ferrosilicon Upon the Process of Carburization," by E. G. Mahin and F. J. Mootz, Notre Dame University, Notre Dame, Ind.

"Resistance of Steels to Abrasion by Sand," by Samuel J. Rosenberg, Bureau of Standards, Washington.

"Metastable Equilibrium in Hyper-eutectoid Iron-Carbon Alloys," by A. A.

Business as Others See It

Digest of Current Financial and
Economic Opinion

PRESSURE for a readjustment of the wage scales of the days of plenty is coming from many quarters. *Commercial and Financial Chronicle*, for example, argues that it is unfair that all the savings from increasing use of machinery should redound to the advantage of labor and none accrue to the benefit of the consuming public. That authority inquires:

"Is it not an absolute necessity at such a time that the country get back to first principles, and the consuming masses be allowed at least a portion of the savings effected through invention, machinery and mass production, none of which are the achievements of labor?"

Labor enters the picture from another angle—unemployment. It is universally regarded as serious. But one authority points out that

recently "the employment bureau maintained by the City of New York was unable to fill a number of vacant positions because the expert labor required was not to be had. The expert laborer or trained specialist can generally find work, but the man without skill often declines the only work for which he is fitted."

Not Much Improvement Yet

During the depression which reached its depths nine years ago a great impetus toward recovery was given by the large-scale building of houses. Today that element is conspicuously lacking. One investigator reports that the main trouble seems to lie in second-mortgage "racketeers." "Usurious interest rates, hidden charges and unscrupulous real-estate salesmanship," he says, "have virtually stifled the ability of the average

salaried man to finance a home."

"Wistful waiting" is blamed by one business leader for the delay in getting things definitely on the up-grade. "What is needed," he says, "is more individuals working in an intelligent manner to make their own business prosper."

While this further lag is widely recognized, certain indicators are held to point unmistakably to recovery. Thus *Business Week* reports that utility managers believe that business has rounded the turn. Also, spot deliveries of merchandise, to fill depleted retail stocks, are said to be impossible to obtain. "Manufacturers have held down output, while wholesalers have reduced their investments in merchandise which right now would produce long-looked-for orders."

Prices are found more stable. National City Bank of New York believes this augurs well.

Bates and D. E. Lawson, Case School of Applied Science, Cleveland, and H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

The American Welding Society schedule lists these papers at its various sessions:

"The Examination of Welds by the X-Ray Diffraction Method," by J. T. Norton, Massachusetts Institute of Technology.

"Fatigue Investigations of Welded Joints," by G. E. Thornton, State College of Washington.

"Stress Distribution in Welded Joints," by Milton Male, University of Pittsburgh.

"Testing of Welds," by Gilbert E. Doan, Lehigh University.

"Welded Steel Bar Joists," by Frank Burton, Steel Joist Institute.

"Cost of Using Welding," by Robert E. Kinkead, consulting engineer.

"Strength of Welded Joints in Tubular Members for Aircraft," by H. L. Whittemore, United States Bureau of Standards.

"Tensile Tests for Welds," by J. W. Owens.

"Bend Tests for Welds," by W. B. Miller.

"Shear Tests for Welds," by Andrew Vogel.

"Impacts and Fatigue Tests for Welds," by C. H. Jennings.

"Double Lengthening Railroad Rails," by L. C. Ryan, Oxweld Railroad Service Co.

"Building Up Battered Ends of Rails," authors to be announced later.

"Welded Steel Tubing," by J. S. Adelson, Steel & Tubes, Inc.

"Magnetic Testing of Butt Welds," by T. R. Watts, Westinghouse Electric & Mfg. Co.

"Welding of Stainless Steel," by L. W. Hostettler, Allegheny Steel Co.

"Arc Welding of Aluminum," by W. M. Dunlap, Aluminum Co. of America.

"Oxy-Acetylene Welding of Corrosion Resisting Steels," by W. B. Miller, Union

Carbide and Carbon Research Laboratories.

The American Institute of Mining and Metallurgical Engineers offers the following program during the National Metal Congress:

Monday, Sept. 22

10:00 a. m.—Iron Ore Session—Iron and Steel Division.

"Some Aspects of the Iron Ore Situation," by F. B. Richards.

"Beneficiation of Iron Ores from the Blast Furnace Viewpoint," by Ralph Sweetser.

"Resistance of Iron Ores to Decrepitation and Mechanical Work," by T. L. Joseph and E. P. Barrett.

2:00 p. m.—Iron Ore Round Table—Iron and Steel Division.

Tuesday, Sept. 23

12:00 m.—Luncheon Meeting, executive committee, Institute of Metals Division. Dining Room No. 9.

2:00 p. m.—Joint Session on Theoretical Metallurgy—Institute of Metals and Iron and Steel Divisions.

"Studies Upon the Widmanstätten. Part I. Introduction. The Aluminum-Silver System and the Copper-Silicon System," by Robert F. Mehl and Charles S. Barrett.

"Cemented Tungsten Carbide," by L. L. Wyman and F. C. Kelley.

"Transformation of Austenite at Constant Subcritical Temperatures," by E. S. Davenport and E. C. Bain.

6:30 p. m.—Joint dinner of Institute of Metals and Iron and Steel Divisions.

Dr. B. D. Saklatwalla, Vice-President, Vanadium Corporation of America, will give a non-technical talk on Vanadium.

Wednesday, Sept. 24

2:00 p. m.—General Technical Session—Institute of Metals Division.

"Influence of Casting Practice on the Physical Properties of Die Castings," by Charles Pack.

"Effect of Certain Alloying Elements

on Structure and Hardness of Aluminum Bronze," by Selma F. Hermann and Frank T. Sisco.

"Thermal Conductivity of Copper Alloys. Part II.—Copper-tin Alloys. Part III.—Copper Phosphorus Alloys," by Cyril Stanley Smith.

"Application of X-rays to Development Problems Connected with the Manufacture of Telephone Apparatus," by M. Baeyeretz.

Thursday, Sept. 25

10:00 a. m.—Alloys Session—Iron and Steel Division.

"Practical Observations on the Manufacture of Basic Open-hearth High-Carbon Killed Steel," by W. J. Reagan.

"Development of Castings for Deep Wells," by F. W. Bremmer.

"Manufacture of Basic Open-hearth Steel of Forging Quality," by William R. Fleming.

2:00 p. m.—Aluminum Session—Institute of Metals Division.

"Constituents of Aluminum-Iron-Silicon Alloys," by William L. Fink and Kent R. Van Horn.

"Aluminum-Silicon-Magnesium Casting Alloys," by R. S. Archer and L. W. Kempf.

"Equilibrium Relations in Aluminum-Antimony Alloys of High Purity," by E. H. Dix, Jr., F. Keller and L. A. Willey.

"Equilibrium Relations in Aluminum-Magnesium Silicide Alloys of High Purity," by E. H. Dix, Jr., F. Keller and L. W. Graham.

"Modulus of Elasticity of Aluminum Alloys," by R. L. Templin and D. A. Paul.

"Quenching of Alclad Sheet in Oil," by H. C. Knerr.

"Experiments on Retarding the Age Hardening of Duralumin," by E. H. Dix, Jr., and F. Keller.

Program for the iron and steel and machine shop practice divisions of the A. S. M. E. was published in THE IRON AGE, Aug. 14, page 440.

THE IRON AGE

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IRON AGE PUBLISHING CO.
239 West 39th Street,
New York, N. Y.

Cable Address: "Ironage, N. Y."

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UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

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CHICAGO, Otis Building
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IRON AGE PUBLISHING CO.
Member, Audit Bureau of Circulations
Member, Associated Business Papers
Published every Thursday. Sub-
scription Price: United States and
Possessions, Mexico, Cuba, \$6.00;
Canada, \$8.50; foreign, \$12.00 a
year. Single Copy 25 cents.

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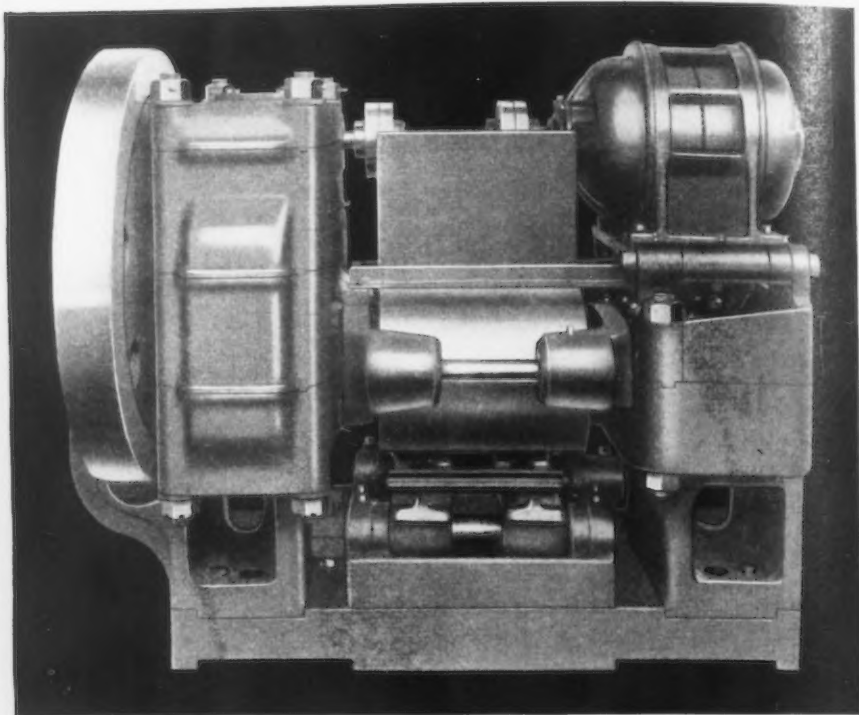
"Bravo!" Shouts the Jury

THE first reader to comment on the changes we made recently in the editorial section was the *Gibby Foundry Co., East Boston, Mass.* "Too soon to judge of the merits of the change. Years ago I bought an auto that the first week seemed to be perfect; in about three months its weakness showed up and in six months it was a wreck." We shivered with apprehension.

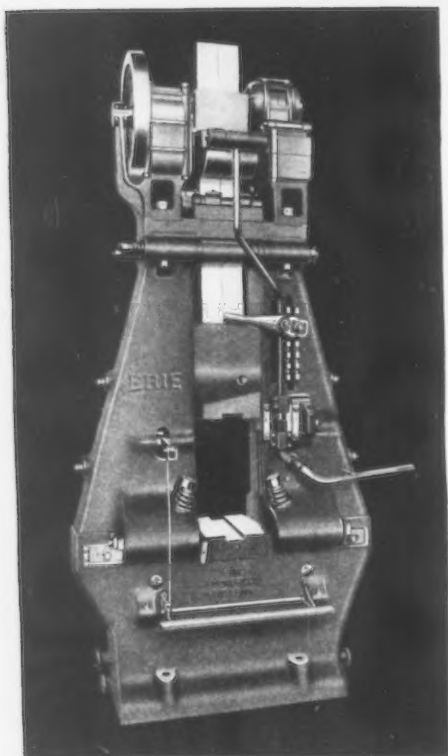
Not until the next mail did our blood again course gaily. "Very much pleased. Use THE IRON AGE daily."—*Hyatt Roller Bearing Co.* "You have simplified the journal and added to its attractiveness."—*Robbins & Myers, Inc.* "A step in advance."—*H. B. Smith Co.* "We like the improvements."—*Carver Cotton Gin & Co.* "Heartily approve the change."—*Grabler Mfg. Co.* "You certainly are to be complimented."—*Austin Mfg. Co.*

Every mail brings us bouquets. We are smiling from ear to ear.—A. H. D.





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